

# HOW TO IMPROVE EGG QUALITY



**THE SMART WAY TO  
GET PREGNANT**



Darja Wagner, Ph.D.

# LATE BUT NOT TOO LATE

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## *THE SMART WAY TO GET PREGNANT*

By Darja Wagner, Ph.D.

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**BIOGRAPHY:** Darja Wagner, Ph.D. is a molecular biologist specialized in understanding human cells. She is the author of the blog *All About Egg Health* at [www.paleo-mama.com](http://www.paleo-mama.com), where she addresses fertility and getting pregnant for women over thirty-five. She lives in Berlin with her husband and two sons, both of whom were born after the age of thirty-five, using techniques she has explained in this book.

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***All About Egg Health* [www.paleo-mama.com](http://www.paleo-mama.com)**

# Why I wrote this book: There was a woman impatient to get pregnant

I was thirty-five, when I first tried to get pregnant.

I felt awesome at the time – in great physical and mental shape and with important career milestones already behind me. At my side was a man I loved, and together we looked forward to our wedding. For the first time in my life, nothing serious stood in the way of me finally becoming a mother.

Expecting the whole process to go perfectly, I recall crying the first time my period arrived at the moment I thought there was enough reason for it not to. Though it was clear to me that there was no guarantee that anyone would become pregnant at the first thought of it, I still felt disappointed. Even more, I almost felt insulted! Not being able to get pregnant as fast as I had expected clearly looked like a failure, and did not fit into the world I had lived in.

After crying over the next two or three cycles, I went to one of the best fertility clinics in the town. As we live in Berlin, it turned out to be one of the best of its kind in Germany.

I thought the doctor would send me home, say something reassuring like, “You are young and have plenty of time”, or tell me to otherwise turn my biological alarm off. I mean, that’s how everybody talked to me for years.

She didn’t.

Actually, after taking a quick look at my blood test, she said:

“What made you wait so long?”

*What made me wait so long?* Great. I felt like a bad mother before I even got a

chance to become one.

Then the doctor explained my hormone values to me, the bizarre thing was that there was nothing wrong with them - only that they were indicating someone who was much older. I was healthy and fit, but, according to several blood values, I was beyond childbearing age, and with very few eggs left - the kind of woman whose chances of natural conception were slim at best, and even with the help of advanced technology, still so poor, that clinics in many countries would not bother to treat me in order not to ruin their success rates.

The doctor recommended that I start IVF immediately. The reason was that there was nothing to be won by waiting to get pregnant naturally, and even the chances that IVF would work for me were lower than for other women of my age.

I had no idea how to handle so much bad news. In my mind, parts were trying to reconnect with each other and make sense, with no success.

In spite of two decades of training in life sciences, there I sat, unsure what to think next. I knew how to take care of the cells of people and animals under the microscope, yet I had let my own eggs disappear.

Then, I whispered something about how I thought one should start having children once other important things in life had been figured out, and how my grandma conceived my father in her late thirties, too.

“And how is it with your *mother’s side*?” the doctor asked.

I didn’t know.

By the next time I visited her office, I found out that my mom had entered menopause almost ten years earlier than would be expected for a woman of her age. As this fact did not have any meaning for her life (my sister and I were already grown up), she never mentioned it. So there was nothing surprising about the fact that my own ovaries and eggs already looked pretty exhausted.

I felt desperate. You know, that particular *kind* of desperate.

The kind of desperate that only those who have gone through it will know.

The kind of desperate, that when you wake up in the morning, the world you left behind yesterday is not the same anymore, and objects and people seem distant and strange. Cold moves into your stomach and heart and doesn't go away.

The kind of desperate, that, within weeks, you lose interest in your friends, and your new best friends become the women who themselves have to live with thoughts similar to yours, thoughts that they may never become mothers.

The kind of desperate, which makes you envy any woman who has a *real* infertility disorder: PCOS, endometriosis, blocked tubes – suddenly they all seemed like a summer breeze, because they all harbored a possibility and a hope. With me, the fertility window was just about to close. Time had run out. Too bad.

After the first days of initial shock, my blood came back. Myself, as I knew it, returned and sat at the same place in my head. Thoughts slowed down, and I was able to accept the only solution which was left, to get myself together and fight. Go on with my life, career, and the relationship. Find a way to extract the maximum out of my body and the eggs I still had.

Strangely, when I remember that time, I recall only anger.

I kept thinking, what is all that hype about women and careers?

Why are women not told more clearly that after a certain age, our eggs decline in quality and then disappear really fast?

Why did I spend so much time keeping the outside of my body fit and youthful, instead of caring more for my ovaries and eggs inside them?

Why is research that goes on in the field of female fertility not given more attention?

I was aware that many people believe that fertility in women of advanced

reproductive age can't be improved naturally to any significant extent. But, I was also aware of new research which was clearly proving otherwise. I decided to try.

I knew cells; they were my profession. The challenge was to understand how the ultimate source of all cells - *eggs* - tick, breathe, and live. My goal became to undertake everything possible to improve the quality of the eggs I had left. I decided to act as a personal trainer for each one of them and make at least one give me my baby. Our baby.

I learned like crazy, researched medical journals, gathered and compared conference slides, wrote to scientists and medical doctors. There was a lot of information and even more noise around it. Especially in the vibrant world of the Internet, everyone seemed opinionated and smarter than the others. I found countless websites which looked like helpful information at first, but after minutes turned into just another platform for product marketing, with strict keyword-optimized content suited for Google, but not for women who are over thirty-five and want to improve their chances of getting pregnant.

I admit, years spent in biomedical research and working in some well-known institutions did prove advantageous. First, people with authority were answering my emails promptly and honestly, and on several occasions I was given the information which was not included in their publications or was otherwise not obvious. That gave me a good feeling of being understood and supported by those who know best. Second, I had free access to journals and databases where results of medical research are published (but this is an obstacle which nowadays can be overcome as told in the chapter "Whom to believe").

Countless hours spent over the years in writing and reviewing other people's research paid off in an unexpected way. I could easily sift through the data, filter out the most relevant publications and studies, and learn quickly.

As a matter of fact, after several months of filtering out the noise, I finally



realized just how *little* information was actually out there. Why was there not more information available on such an important topic?

I suspected the following reasons: first, the growing population of women who are trying to get their first or second child after the age of thirty-five is a relatively recent phenomenon. Second, unlike sperm, which is just waiting to come out, eggs are hidden deeply inside the woman's body. This is one of the reasons why research on women's eggs is quite recent and knowledge started pouring in only with advances in assisted reproductive technologies (IVF, ICSI - you probably heard about that).

To this, there is an across-cultural and widely male-dominated tendency to interfere with all processes surrounding female fertility. In many countries, there are various ethical, religious, governmental, or simply financial issues attached to this research topic, which is slowing down the pace of objective research. This is the only way I could explain to myself, why even some basic facts about eggs and their metabolism became known only in recent years.

Months were passing by. I was waiting to get pregnant. My impatience was huge, but no larger than my self-discipline directing it into investigating, reading, and asking.

Well, on most days. Sometimes, it all felt plain crazy, and I thought my mind would burst like a cheap wine glass and never come back.

Eggs were on my mind so much that at one point, I couldn't look at the moon anymore without seeing one healthy egg ready to ovulate.

Or, I would see an empty egg box in my fridge and think, is this how my ovaries will soon look?

The best pieces of information I could extract from leading medical journals, I was applying immediately to my own nutrition and lifestyle.

I had to leave behind several of the comforts which I had come to take for

granted, change the way I ate, relaxed, and even thought of my body. But, from today's perspective, the whole exercise was easier than I expected it to be.

In parallel to introducing changes to my lifestyle, my husband and I continued with the autopilot routine of medical interventions suggested by our fertility clinic. We were lucky to live in Berlin and to be treated by some of Germany's best experts. Just as they predicted, getting a woman like me pregnant was not an easy task. More precisely, we kept trying and waiting, and trying and waiting, but nothing ever happened for me in the fertility clinic.

Five years later, I am a proud mother of two sons. Neither of them was conceived via IVF.

Just a coincidence? As a scientist, I can't exclude that possibility.

But, just in case my self-directed efforts really did help me improve the quality of my eggs to the extent that I naturally got pregnant, twice, I have written this short book.

On the complex issue of improving egg quality with DHEA, I had the privilege to have my writing reviewed by the pioneers and stars in the field, Drs. David Barad and Norbert Gleicher (Center for Human Reproduction, New York). I am very grateful for their helpful comments. Thank you to Dr. Lubna Pal (Yale University School of Medicine) whose research I cite throughout the book, for encouraging my writing on fertility and vitamin D. I am thankful to Dr. Robert Casper (Toronto Centre for Advanced Reproductive Technology) for his helpful insights on CoQ10 and his optimism that I would succeed in getting the message across. (As I'm updating this book in June 2015, Dr. Robert Casper is all over the news for his new and revolutionary IVF method AUGMENT, which specifically helps women with egg quality issues to get pregnant. The summary of the new method is included in the last chapter).

Knowing that many women are not aware of the scientific vocabulary behind the clinical studies, treatments, and supplements, I have tried to write as clearly as

possible and have asked several “normal” friends – to review and improve the manuscript. Thank you to Maria Brenz, Ph.D.; Jelena Anacker, Ph.D.; and Irini Athanassakis, Ph.D. for your time and support, for reading every line of my manuscript with care, for your constructive criticism, questions, and comments.

Now that the book is in its second year on the market, I would like to say thank you to the many readers who wrote to me and shared the details of your fertility journeys with me. I rarely feel so happy as when I receive your reports on improved egg quality due to the methods outlined in the book. For this I am deeply grateful.

Hopefully, you will keep finding my research and my experiences useful. I wish you a lot of luck, a joyful pregnancy, and time afterwards.

## **Who is this book for?**

This book is written for all women who care about their fertility. Especially likely to benefit from reviewed scientific reports are:

- ~ All women who are impatiently waiting to get pregnant (whether the first time or already a mother).
- ~ Women in fertility treatments.
- ~ Women's health-care professionals who may not have enough time to review new data from the field of fertility research and prefer a summary written by a research scientist.

## **What will you find here?**

Here, you will find out exactly what to do to improve your fertility and your chances to get pregnant. Although this advice applies to all women, it is especially true for women who are above thirty-five.

All the information presented here is backed up by clinical studies and recent scientific research; at the end of the book you will find the sources that you can follow further, *which I strongly recommend*.

There are many reasons why couples can't get pregnant. There are medical conditions such as blocked ovarian tubes, endometriosis, polycystic ovaries, sperm issues, and some others that we are just beginning to understand. The good news is that most of them can be treated and people healed. Even if nothing else works, couples can still get pregnant via IVF, which simply bypasses multiple fertility issues at once, especially those coming from the man's side. *However, the single most important factor which is ruining women's chances to get pregnant and for which no reliable therapies exist at the moment, is her age.*

In terms of biology, age translates as egg quality.

In the past, dogma was that women's eggs worked something like a kitchen timer, set to expire at a certain age, their quality strictly predetermined and irresponsive to any inputs coming from outside. Like so many other times in science, this turned out to be a hollow dogma.

Recent research has shown that there are actually several ways to affect the quality of women's eggs, and therefore, extend her fertility lifespan and improve her chances of becoming pregnant. However, that process takes some effort and understanding, and is not as easy as swallowing one multivitamin pill in the morning and thinking in 'one-size-will-fit-all' mode. That's why I made research reports on improving egg quality my top priority and a central part of this book.

You will also find a lot of distilled and ready-to-use information on many other topics. For example:

~ How to find out how many eggs you have left.

~ What to eat during preconception time. Which is the latest scientific evidence on fertility-improving foods?

~ Which are the best stress-coping techniques while waiting to get pregnant?

~ Sperm issues in men which are tricky for women over thirty-five, and how to deal with them.

~ Tips on how to improve communication with partner, friends, and doctors while waiting to get pregnant.

~ How to track down the moment of ovulation and make the best out of it.

At all times, I give you summarized information found during the years I was trying to conceive my two children. I will guide you on what you need to know if you are over thirty-five and trying to get pregnant in the most natural way possible.

## **Not your first child?**

A common misconception that most women have is that having conceived a child easily the first time, further pregnancies and children are secured. Unfortunately, this is clearly not the case.

Having given birth to one child does give you certain advantages, though. You know that your uterus is hospitable and capable of growing a baby. Your body has the wisdom of giving birth, and you have a generally more relaxed attitude about getting pregnant (or are simply too busy caring about older children and can't get as desperate as women who are stacked in the waiting process over a long time).

Still, aging is something that you can't stop. Your eggs will continue to age (meaning they lose the capacity to produce babies) whether you are taking oral contraceptives, being repeatedly pregnant, suppressing ovulations due to years of lactating – aging continues inside just like on the visible surface of the body.

Even assuming that your partner's sperm has a high-fertility potential that remains constant over time, and further assuming the rest of your own reproductive hardware stays fit (meaning no endometriosis, ovulation issues, infections, or big changes in body mass index), your ovaries will age, and this is something you can't prevent. You can only slow it down and stretch your reproductive time to some extent, which is individually set. Some women can slow their biological clock for years, some much less, and this is something determined by both genetics and lifestyle. That's why understanding the principles of keeping ovaries fresh and fit is essential for every woman, regardless of whether or not they have had children.

## **Before we start: May I ask you to do me a small favor?**

As you realized already, I am not a native speaker. English is not my first language (and not even German is my first language). I have written (and self-

published) this book not to impress you with my grammar skills, but because I strongly felt that I had something important to say. I struggled with infertility, I'm educated to extract the high-quality information on the topic of improving egg quality, and I am not associated with any pharmaceutical company or organization; so who else should let you know what works or not?

I'm truly convinced that the information which you will find here will be some of the best advice you will receive on your fertility journey (and some of the least expensive for sure). That's why I dare to ask you to do me a small favor, okay? If you discover any serious stylistic and grammar flaws, please let me know and I will make sure to correct them in the next version. And I would highly appreciate if you could leave a short review on Amazon by [just clicking on this link](#); it is really incredibly easy to post an opinion, and one to two authentic sentences from your side could help more women find out what to expect in the book. Thank you.

# Late childbearing today

Women in the developed world are delaying childbirth for many reasons. In the last ten years, first births for women thirty-five to thirty-nine years old increased by 36%, and the number of first-time mothers in the age group of forty to forty-four years old increased by 70%. The trend is not new, and the statistics for the decades before showed that the increase in the mean age for U.S. women having their first baby from 1970 to 2000 was 3.5 years, becoming even larger when they give birth to their second child.

With such an explosion of late mommies, one would almost come to the conclusion that fertility is *increasing* with age or that getting pregnant must be an easy task, right?

The bad news is that, as women age, chances to get pregnant actually decrease. Same goes for chances to *stay* pregnant, as well as the number of eggs available for fertilization each month.

About one-fourth of women over thirty-five years will experience difficulties when trying to get pregnant, or start some sort of fertility treatment. For them, I mention things which are especially important to consider or to talk to their doctors about. But if you are trying to get pregnant for only a few months, are not undergoing fertility treatments and are otherwise healthy and fit, you can ignore this information and only select the parts of the book that you feel pertain to you.

Waiting is something that sucks, and I have nothing good or new to say about that. Sperm issues, bad intercourse timing, blocked tubes, implantation issues, or simple luck – they all play a role. But I don't talk about that right now. I talk about the most essential factor of all – the quality of a woman's eggs.



## **The biological clock is here to stay**

Can you imagine that, by the time women come into their forties, up to 90% of their eggs are not able to give viable embryos any more, and by the time we are forty-five, the chances of a successful pregnancy, even with the help of IVF, fall to fewer than 5%? These facts are so brutal that many women choose to ignore them rather than do something about it. Don't be that woman. Educating yourself is the first step to managing and gaining control over this important step in life.

Squeezed by expectations, long stretches in education, and the pressures of the workplace, many of us wait until after thirty-five to start having babies.

Unfortunately, in terms of our biological clocks, it is actually the mid- to late-twenties that are best for having children (or your first child at least). This time window is best suited for both mother and infant, and that is a reality which won't be changed any time soon.

Speaking from the ground of human evolution and physiology, anyone who is serious about becoming a mother should not miss this window of opportunity. The good news is that, due to the extension of human life expectancy, there is actually still plenty of time left for women to pursue their careers, partnerships, or whatever else they may wish for.

A recent study in Sweden investigated the effect of various lifestyle and biological factors on fertility in a sample of 1,578 randomly selected women. After adjusting for the natural variations within the sample, researchers found out that biological factors, such as age at conception, or even the length of menstrual cycles, accounted for most of the time waiting to become pregnant; indeed, these factors were better in predicting time to getting pregnant than any of the lifestyle factors, such as occupation, or use of oral contraceptives prior to attempting to conceive.

Put simply, doing everything else in life first and intentionally delaying pregnancy until after thirty-five is a risky idea. Unfortunately, for most of those reading this book, this window closed long ago. Still, you can try to someday give this advice to your daughter.

To date, there is no known intervention to reverse the biological clock and improve egg quality and pregnancy rates in women of advanced reproductive age. But the good news is that, thanks to many women in fertility treatments, doctors have learned a lot about women's eggs in the last years. For those who are able to understand the results of what they've learned and adapt them to their own life, there is a good chance to benefit from these discoveries and improve their own fertility and chances to get pregnant. *To slow the clock for a few minutes; minutes, at the time when seconds can decide.*

# Ovarian reserve: What it is and what you need to know about yours

Ovarian reserve represents the egg pool of a woman.

In the mind of a pessimist, the ovarian reserve of a woman over thirty-five is what is left after decades of contraception, wrong partners, and over 200 monthly bleedings. In the mind of an optimist, the ovarian reserve is your Holy Grail, your treasury filled with open possibilities, and one of the best sides of you.

One way or the other, the ovarian reserve represents all the eggs which you have and which you will ever have. This is why it is so important to know about your ovarian reserve as much as possible.

You can start by talking with your mother.

## Things your mom hopefully told you

Just like the visible traits that are passed genetically from parents to children, so are those we can't easily see, and the size of an ovarian reserve is one of them. Actually, one way in which research is trying to understand the menopause of a woman is by analyzing the menopause pattern of her mother. Recently, it was found that the ovarian reserve declines faster in women whose mothers underwent an early menopause, suggesting that the fertility potential of a woman is, at least to some extent, inherited from her mother.

When you talk with your mom, ask her some general questions first (hopefully you will not have to do that in a text message like I did). Ideally, most answers will sound familiar, so you only need to add some extras to what you already

know.

*Find out how your mom's life was when she was pregnant with you. How old was she? How was her nutrition (remember, her pregnancy is the time during which your eggs were created)? Did she have a lot of stress and how did she cope with it? Was she exposed to any extreme circumstances, such as radiation? When did her menopause start?*

Some women enter menopause very early, some in their mid-twenties, and there is a strong genetic component to this. So, if your mom tells you that her menopause started much earlier than what is expected for an average healthy woman (age forty-eight to fifty-one, although this can vary considerably from one woman to another), that could be reason enough for you to visit a fertility specialist and have a few values checked.

But, whatever your mom tells you, make sure to not overinterpret this information. You are an *individual*, your own set of genes and life circumstances, not a copy of either one of your relatives, and not a data point in any statistical set. When it comes to genes, there is not much you can do anyway, apart from knowing early enough and planning accordingly.

*In summary, if your mom tells you her menopause started five to ten years earlier than expected, you may have a reason to visit the doctor and take a few tests (the same goes for those who are over thirty-five and trying to conceive for longer than six months).*

On the next pages, you will learn how to find out more about how many eggs you have left and what exactly needs to be checked. For all others whose ovarian reserve is sufficient, or who are simply determined to stay away from doctors and try only natural means of conception, you can skip that part and go directly to the chapter entitled “Magic of ovulation and how to stay in flow with it”.

# Why did we know so little about eggs?

If men had eggs, the world would probably get to hear much more about them.

Imagine ovaries – organs placed deep in the abdomen, but still taking orders directly from the brain. Even while deeply resting, ovaries can sense the information coming from your mind, body, and even the world around you. And your eggs in the ovaries – thousands of beauties quietly sleeping for decades, until a wake-up call from the brain comes, and they stand up, fit and full of power to rush for a date, and wave in a guy with whom they will create...one new little person! A person you've never seen before, yet whose face looks completely familiar.

I am sure, if men had anything like eggs, the world would be more aware of how powerful they are, and products for their fitness and health would be available on the shelves of every drugstore.

Unlike sperm, which are just waiting to come out and introduce themselves, eggs are a pure mystery.

They number fewer, *much* fewer, than the number of sperm expelled in a single orgasm. Eggs never leave the woman's body, except when they fail to become fertilized and exit by means of monthly periods (or sometimes in the lab when doctors retrieve eggs for IVF or frozen storage).

Eggs sleep deep inside, and in order to take them out, one must not only dig deep into the body, but also penetrate a wall of another organ first – so well they are hidden. That is one reason why we have known so little about eggs until recently – only with advances of assisted reproductive technologies, and doctors

retrieving eggs of women undergoing IVF, have we been able to learn about how eggs are and what makes them healthy and fit.

## **How much do you know about yours?**

The inconvenient truth is, you have only a certain number of eggs.

You were already born with all of them, and there will not be any new ones growing. Every now and then, we have a stir in the scientific community which is raising hopes in the direction of stem cells, renewing women's eggs, and pushing boundaries of fertility toward the fifties and beyond. This is exciting research, and someday it will surely change the lives of many women. However, chances that this will happen in the next few years, before your eggs disappear, are so slim that it is better to live without relying on them.

*The eggs that you have right now are your true treasury.*

They are your life savings, and your secret weapon. If you can't see them directly in the way you see your skin every morning in the mirror, it does not mean they are not there. Your eggs are resting inside you, waiting to give a new life someday - a life which will outlive you and hopefully give a lot of fun and meaning to your life.

That's why the least that every woman can and must *do* for her eggs is to give them the love and attention they deserve. It is best to start at a young age and never come to the point where you have to rely on your last eggs to become a biological parent. But, if you are not that young anymore, it does not matter. Please think how lucky you are to live in the age when science has come a long way in understanding eggs, and how wonderful it is that you still have time to apply some of that knowledge to yours.

**No eggs – no baby!**

There is no way you can overestimate the importance of having good quality eggs for your chances to get pregnant.

Eggs lead to an embryo, and an embryo leads to a pregnancy. Pregnancy leads to a baby. Eggs are at the beginning of everything, and *nothing* in terms of becoming a mother happens without them.

That is so important that I will say it again: you can have a bad temper, or bad hair, or a bad relationship, and still get pregnant, but with bad eggs this will not happen.

*Without at least a certain number of good, quality eggs you cannot become a genetic parent.*

Here is a glimpse from the world of your eggs:

You already had your entire egg reserve by the time you were a *five-month-old fetus*, living in your mom's belly. Weird, right?

You had six to seven million eggs at that time and were closely connected with your mom through the blood cord. Consequently, your mom's nutrition and lifestyle affected your egg quality, as well as other features of your future children - research is still working on figuring this out.

You were born with about one to two million eggs and, for the next decade or so, they did not play any particular role in your life. Your eggs were just resting until you reached puberty.

The onset of puberty can be seen as ground-zero of any woman's reproductive life.

Women enter ground-zero with approximately 300,000–400,000 immature eggs. This is a whole lot, but they will degrade at a rate of up to a thousand or more per month - with each new monthly bleeding about 1,000 eggs will disappear forever.

Why do so many eggs disappear? Because at the beginning of each menstrual cycle, your brain sends a wake-up call to a whole bunch of cells to get ready and mature for ovulation. Why so much wasting? Well, there is a lot of competition and selection going on in the egg world – the vast majority of cell candidates will be opted out or end up having a supportive or a nourishing role, and only a single cell will become THE egg that will get a chance to ovulate.

If pregnancy does not occur, all this unused material gets stripped out of your uterus, in the form of monthly bleeding, that is flushed down the toilet.



# How many eggs do you have left?

There are several ways to more or less reliably find out the size of your ovarian reserve. Maybe you've heard of online tests which help to find out how many eggs you have and what your chances to get pregnant with them are? Depending on the test provider, women are asked some basic questions: height and weight (which helps calculate body mass index), whether you've been pregnant before, lifestyle habits including smoking, your partner's age and any possible causes of infertility that you may know about.

Then, there are home tests. Just in case you've heard of "Egg tests" which give results based on a drop of blood, I strongly suggest you do not try these. Testing hormones in a meaningful way is not as simple as, for example, checking one's sugar levels (or even testing sperm at home, as you will read later on).

While both online questionnaires and home tests can give some useful information and are good for initial screening purposes, they are not very individual and still leave you with the most important question open. So if you want to find out how many eggs you really have, you will have to consider making a single visit to a fertility doctor.

IS THERE SOMETHING COMPLICATED COMING UP NOW? No, it's really easy. There exist several "markers of ovarian reserve" - hormones which are easily measured in the blood. Most reliable among them are FSH (Follicle-Stimulating Hormone) and AMH (Anti-Müllerian Hormone, more about it later). Combined, they give a good estimate of how many eggs a woman has left. So you have to find out what their values are.

Please understand that FSH and AMH don't tell much about the egg quality, but later in this book I give you suggestions on how to work on that part. But first

you have to know that the *eggs are surely there*.

This is also a reason why you need a lab which delivers reliable results and an experienced person who can put the values together in a meaningful way.

Good news is that both FSH and AMH are easy and affordable to measure. So even if you have to pay for the test yourself, the price will be comparable to one piece of clothing, which makes it a worthwhile investment in your family plans.

By the way, FSH can best be assessed on the third day of your menstrual cycle (so just before the period is over). AMH is more stable in the sense that its values do not change much throughout the cycle, meaning that by giving your blood sample on the third day, you can get *both readings at once*.

Other good news is that there is no need to feel too anxious while waiting for the results! No matter what the FSH and AMH values turn out to be, it is never a single parameter (or two) that decides on the questions whether or when you will become a mother. There are other factors that play a role in estimating size of ovarian reserve (such as ovarian volume and antral follicle count), but at this stage you don't need to worry about them. Instead, let's take a closer look at the first ovarian reserve marker - what FSH is and what you need to know about it.

## **Things to know about your FSH**

For most people, FSH may be just another strange abbreviation from the fertility world. A quick search on Google tells you it stands for "Follicle-Stimulating Hormone." But, those who are trying to get pregnant are insatiably curious and understandably wish to know more than that.

That is a funny development; women who before the baby-making project were not able to remember their phone number suddenly use hormone abbreviations as if these were the names of their best friends. Folks in fertility treatments often fear the moment when new FSH results arrive. Why?

Like many other things, FSH comes from the brain. At the beginning of each menstrual cycle, your brain is sending streams of FSH text messages, and this tells your eggs to start preparing for the ovulation. As we age and our egg storages decrease, the brain must send more FSH to stimulate the ovaries to work. As you can imagine, the brain has to *scream* to make ovaries ovulate.

For a woman who is trying to get pregnant, admitting to a high FSH level is as pleasant as letting people in the sauna know you have athlete's foot, or worse, as there is no treatment for it. An increased FSH level is a normal part of getting older, and one should not overestimate the power of science to stop that. But please keep in mind that FSH is a marker of your reproductive age, not your chronological age. PARDON ME? It means, ovaries may sometimes be exhausted, and FSH high, even in women who are very young, and vice versa. Luckily, this is a case in only about 10% of all women.

It is best to have FSH values under ten IU/L. At some point (typically after the age of thirty-five, but this is very individually set), FSH starts to oscillate in values from one cycle to another. This can continue for many months, or even years, with a general tendency of FSH going up and staying there.

FSH rising above ten IU/L (IU stands for International Units and is commonly used in the measurement of medications and vitamins) is a sign of your biological clock trying to get your attention, and it is at this point that those who are serious about becoming parents have to take action. High FSH is not fun to deal with when trying to get pregnant. It is not a reason to panic either – if other circumstances come together in a favorable way, you still may get pregnant before you ever know your FSH is high. However, if other unfavorable factors add to this, such as mild sperm issues, bad intercourse timing, decreased egg quality, before you know it you can find yourself in need of fertility treatments.

Menopause does not occur overnight, but with increasing FSH, women enter a phase of decreased fertility, and there is often some waiting involved in getting

pregnant. In addition, there are fewer eggs of sufficient quality available, so it can take some time before the right one comes down your ovarian tubes.

At some point, FSH becomes greater than twenty IU/L, which is (together with other predictors) a sign that the egg pool is pretty much exhausted. However, as long as there are any eggs left in the ovaries, there is no reason to panic. Small miracles and healthy pregnancies can and do happen to women officially already in the menopause.

## **Things to know about your AMH**

AMH stands for Anti-Muellerian Hormone. Anti-what? It doesn't matter. Just a strange name; you can ignore that.

Combined with your FSH value, AMH is a good predictor of your remaining egg reserve.

In a very simplified form, AMH is a substance produced by the cells which support eggs. This means - the more, the better; however, you don't want to have too much of it because this would point in the direction of polycystic ovaries.

When AMH goes down to one or two ng/mL or less (typically above age thirty-eight), it is a strong indication that there is no reason to be casual about your chances of becoming pregnant. At an AMH level below 0.7 ng/mL, we are speaking of a fertility clock beating its last minutes. At 0.4 ng/mL, you might be watching the rest of your eggs disappear like a waterfall quite soon. An AMH level of 0.2 ng/mL or less is below the edge of detection in most labs, and suggests that the egg pool is so small, that nobody can tell whether even IVF would be possible.

Many clinics suggest egg donation programs long before AMH drops this low. On one hand, this is a great possibility because it helps women to still get pregnant and create a family, but it has downsides as well, the most obvious

being that it is genetically not their child any more.

My message is: Ladies, find out what time it is on your personal biological clock! Have your ovarian reserve markers checked, and find out how many eggs you have left!

With this information, you can better plan and enjoy your life. While you still have a high reserve, there is more time to change jobs, careers, and partners. Once your reserve starts declining, it is time to settle with the one you want to have children with. At all times, you should adapt your nutrition and lifestyle as to support the quality of your eggs and slow the clock down as much as possible. In the next chapters, you will find out more about which interventions are particularly helpful.

# The magic moment of ovulation and how to stay in flow with it

As I promised to you at the beginning, in this book I don't explain things like basics of the female reproductive system, or bore you with too many general remarks.

Hopefully, you have noticed I did not even once mention that you should not smoke while trying to get pregnant? I assume that if you are over thirty, you simply know that.

This is why I will now further assume *you know what ovulation is*.

There are tons of subtle signs by which, even the most busy and stressed woman can know when her most fertile time of the month is approaching. Slight bloating of the lower abdomen, a few slightly painful sensations, an increased sex drive – signs are many and are highly individual. But even if you miss them all, there will almost surely come a moment when your vaginal mucus becomes particularly elastic and stretchy. You have to make an effort to not miss that moment.

Look at the toilet paper after you wipe - often it looks like your nose is running in the wrong place. I strongly recommend becoming friends with your vaginal mucus and also knowing how to find the cervix opening. Once you get familiar with both, you can pin your ovulation down to within several hours. The reason you want to be so accurate and effective is that, in many women, the egg does not live longer than six to twelve hours.

This means that if you miss your ovulation, then the next best chance to get pregnant will come in a month's time and will last for an equally short period of

time.

Why is it that ovulation in women happens so rarely and in such a hidden fashion? There are many physiological and evolutionary reasons for this, but analyzing them would go much beyond the scope of this book. Still, missing an ovulation can feel like a small personal tragedy during the time when your first priority is getting pregnant.

Luckily, there are ways to prevent this from happening.

## **How to find out when you ovulate**

Probably the best way to find out when you are ovulating is to pee on an LH test strip. What's that?! These are simple tests that you can get in any pharmacy or order over the Internet. They work in a very simple way, detecting an increase in one particular hormone in your urine. It is called LH (Luteinizing Hormone) and its increase typically occurs twelve to twenty-four hours before the egg is ready for a date. This means, after your LH test shows a positive result, you have that much time to make your next intercourse happen. Simple, right? And what I love about LH strips is that, as you get more experienced in handling them, it takes fewer to determine the most fertile moment of the month.

By the way, no matter what the pharma companies are telling us – there is no reason for LH strips to be expensive. As opposed to some other tests, made to detect very low amounts of a particular protein in fluids, LH strips detect the strong increase in one hormone, which is naturally a robust indicator. For about 5–10% of women, LH strips will not work because their bodies produce LH that looks slightly different and is not commonly used in tests.

In a nutshell, there is no need to pay for plastic boxes, fancy containers, or branding. Instead, it is better to buy lots of LH test strips and have them ready everywhere, in every bag, and test more often in the days when you suspect ovulation should occur.

You may notice I don't talk about measuring basal body temperature. While this is certainly a good way to detect ovulation and get in touch with your body, after two years of intensely practicing this method, I realized that, for me, it had downsides that finally made me stop using it. First, measuring temperature feels for me plain uncomfortable – I don't like the first sensation in the morning to be an encounter with a thermometer. Another reason is, if you do anything else first – get dressed, grab a coffee, have sex – the readout of your basal temperature afterwards is not certain anymore. To this, add days when you are just not sure whether your body temperature is oscillating due to ovulation or to you catching a cold or having too little sleep.

Finally, that number I saw early in the morning would later keep on dancing in my head for hours, not letting me focus on other things. I know that some women deal with this daily charting better, but for me, measuring basal temperature was just making me number-centered, yet without providing information I could rely on. This is why I switched to LH strips and would recommend this to anyone who does not want to waste too much time before getting pregnant.

So, whatever method you use to become aware of your ovulation, when this precious moment of the month comes, don't waste it!

## **How to make the most out of your ovulation**

One friend of mine complained to me repeatedly that when she knew that her ovulation was approaching, that feeling of "today we must have sex" was making her overexcited and anxious. To release tension, she was regularly starting ugly fights with her husband (which led to everything but sex).

I myself was another extreme – around the time of ovulation I often experienced waves of positive, productive flow, which then too often tipped in the direction of work. So, instead of cleaning my desk, going home early, and having fun, I



was finding myself covered with projects and appointments.

*Don't fall into these traps.*

Save arguments and mood swings for any other day in the month. Maybe one great egg will come down from your ovaries, so why would you miss the chance to make it into a baby? There will be enough time to discuss everything in detail with your partner, but nobody is able to recover the magic of ovulation once it is gone.

Here is what I think you should do once you know you are ovulating (and what I wish I knew some years back):

~ The moment you realize ovulation is about to happen, make this your absolute top priority. This means, drop everything else. Let's go, you will come back later to where you left off.

~ If you are at work, clean up your desk and go home. Yes, just like that. Find any excuse: It does not matter what your colleagues think, there will be enough time to make up for everything. In the next two weeks your progesterone will rise and you will experience your most productive time of the month. Don't let this time be spoiled by a missed ovulation and you feeling angry about it.

~ Make a great Mediterranean dinner (more about this in the next chapter) for you and your partner and don't forget a lot of red wine! If you have children, organize their day so that you can put them to bed early or otherwise get them out of your way. You are not being selfish - on this day (and night) everything is allowed, so take advantage of it.

As strange as it may sound, try not to obsess about having sex, but about having *fun*. Enjoy, tomorrow it will not be there anymore! Everything else will happen as a pleasant side effect, when the time comes. And it *will* come.

# Food for your eggs

Our food is what we are and what we will become, in the most literal meaning of those words.

This chapter could well have been named “Which foods to avoid while trying to get pregnant.” After having studied this topic extensively, I am convinced that one of the biggest problems related to our food can be boiled down to its constant availability, unprecedented in human history.

For our physiology, this is a most recent phenomenon that our bodies still must adapt to. I therefore think that, if any particular diet should be named for giving us ultimate health benefits, including maximal fertility, then it might actually be a diet of elimination. This means that, depending on your particular lifestyle, simply *dropping off fast food, sugars, and toxins* may bring you the same, or even more benefits, than any particular "diet." Unfortunately, this concept has a low commercialization potential, so little wonder there is not much to be heard about it.

Some women are lucky enough to have genes such that neither nutrition nor other components of lifestyle seem to negatively affect their chances to get pregnant. They can eat what they like, take as much as they like of it, and smoke on top. Still, they will remain as fertile as guinea pigs, become pregnant from sex they don't even remember, and have perfect pregnancies and babies. (Yes, I admit I was sometimes feeling bad for not being that kind of woman).

But I am not talking about them.

In this chapter, I talk about other women, who like you and me, have to invest something in their bodies to keep them performing at a certain level.

Modifying your eating style is easy and, in addition to improving your

pregnancy chances, it will help you maximize your health, too. There are two good options in terms of increasing fertility and egg quality. The first one is the Mediterranean diet.

## **Mediterranean diet**

This nutrition style has a solid scientific basis and a proven record of benefits. One study, published in *Fertility and Sterility* in 2010, found that the Mediterranean dietary pattern, when applied six months before conception, significantly increased the chance of pregnancy in 166 Dutch couples undergoing IVF treatments. The couples were asked to answer questions related to their nutrition and lifestyle; on analysis, it turned out that a high intake of vegetable oils, vegetables, fish, legumes, and a low intake of snacks during preconception times positively correlated with their blood folate and B6, and increased the probability of a couple conceiving a baby. Six months of delicious meals alone was sufficient to increase a couple's chances of becoming pregnant. How good is that?

Another study, published in *Human Reproduction* in 2012, went further and investigated the association between people adhering to general dietary recommendations (Dutch dietary guidelines) and their pregnancy chances. The nutritional habits of 199 couples were assigned a score based on the Preconception Dietary Risk score, or PDR score, and their fertility was followed over a period of six months. After adjusting for other factors that negatively affect fertility, such as a woman's age, smoking, BMI, and treatment indications, the authors found out that only a one-point change in PDR value was associated with a 65% increase in the chance of a couple getting pregnant. This result, too, suggests a previously underestimated effect of nutrition on conception rate. Moreover, in this study, pregnancy was defined by embryonic heartbeats confirmed by ultrasound, not just positive blood tests (this eliminates early miscarriages before the ultrasound examination).

The benefits of a Mediterranean diet were further confirmed in a Spanish study from 2012, which looked at the cases of 485 women who reported difficulties in getting pregnant, and concluded that adherence to the Mediterranean dietary pattern enhanced their fertility (for this and other studies please refer to the references at the end of this book).

As in previous studies, the ultimate mechanism behind these effects remained unknown. Is it the high level of antioxidants in Mediterranean vegetables and fruits? Or is it simply a higher folate level, as suggested by results from 2013 coming from the Department of Nutrition and Food Science in Granada, Spain? In that study, the life habits of hundreds of women belonging to three different generations were examined, and it turned out that folate intake was highest in women whose nutrition resembled the Mediterranean style.

Additional bonuses that speak in favor of a Mediterranean diet (apart from its fabulous meals!) are that people who adhere to this eating style tend to have a longer life span and a decreased risk of heart disease. Moreover, studies on the eating habits of more than 1.5 million healthy adults demonstrated that a Mediterranean-style diet was also associated with a reduced incidence of Parkinson's and Alzheimer's diseases. Shall I still go on?

## **How to eat Mediterranean diet**

As a reminder, a Mediterranean diet features mostly *fresh foods that have gone through minimal processing*.

Typical vegetables are: tomatoes, broccoli, peppers, potatoes, onions, peas, artichokes, eggplant, celery, lettuce, and mushrooms.

Fruits recommended in the Mediterranean diet are: apples, grapes, grapefruit, melons, cherries, dates, peaches, and strawberries.

Milk, yogurt, and cheese are okay. Processed carbohydrates are not recommended (white bread and pasta), but eating whole grains instead, such as

rice, oats, couscous, barley, and bulgur is encouraged.

The reason why I am presenting such a long list of foods is not because I am a good cook and am now turning this from a science book into a recipe book, but because I want you to be inspired to eat, and also to *love*, Mediterranean-style food.

We all compromise every day when it comes to having a quick lunch. Therefore it is very important that you *first disconnect* “Mediterranean” from eating spaghetti and American-style pizza with grease and fat (occasional thin-crust Italian-style pizza, with tomatoes and olive oil, has actually been a part of the Mediterranean diet for centuries and was shown to have surprising health benefits in terms of reducing the chance of heart attacks, so that one is acceptable).

When you think of Mediterranean dishes, visualize a table *full of fresh tomatoes, olives, grapes, and fish*. Imagine foods which you share with others and eat slowly - best is somewhere outside, on a sunny day, and served with a glass of wine.

As the matter of fact, a Danish study which examined the association between drinking habits and waiting time until pregnancy in 29,844 women, found that women who consumed wine were slightly quicker to get pregnant than the group who were non-wine drinkers or were consuming other alcoholic beverages. To this, moderate wine consumption is linked to fewer strokes and a reduced risk of several cancers, not observed in groups who were moderate drinkers of beer, spirits, or even not consuming alcohol at all.

One of the prime suspects for the effects of wine and success of the Mediterranean diet is an ingredient called *resveratrol*. Whether resveratrol acts independently, or if it's the mixture of foods and compounds that makes the Mediterranean magic, science still needs to find out. The fact is, resveratrol on its own has amazing anti-oxidative properties and improves cellular energy

status. Most of the studies with resveratrol to date have been done on animals – pigs, mice, and cats, with an almost invariable effect: Intake over a longer time protected against the age-associated reduction of fertility, by means of improving egg and embryo quality.

But does this mean you should jump on supplementing resveratrol?

I certainly would not do that and would instead wait for studies and clinical trials on humans. Before that gets figured out, there are much more important supplements that you should provide to your eggs, and to the rest of your body, which is the topic of the next chapters.

**ONE NOTE FOR VEGETARIANS:** Mediterranean eating style is quite plant-based, which makes it easy to apply if you are a vegetarian or vegan. I have many friends who are vegetarians (my best friend is vegan!), and I have a lot of respect for their choices. I don't eat much meat myself, and when I do, then only meat from grass-fed and pasture-raised or wild animals. However, as a scientist who has invested a great deal in investigating this topic, I have to say that it might be a lot easier to improve health and fertility for women who don't stubbornly avoid meat over long periods of time. Especially if you are a vegan, you may want to reconsider your eating strategy during the years you are getting pregnant, enduring pregnancies, and breastfeeding babies.

**BUT BEING VEGAN IS A MINDSET AND A MATTER OF PERSONAL RESPONSIBILITY?** Think about it, your ancestors were not vegans and had never even heard of this concept. Your genes are not adapted for vegan metabolism, which means that from the evolutionary point of view, people who eat vegan are running quite an experiment on themselves. You are aware of that, right? Vegan is okay in terms of personal freedom, but it is not okay in terms of stretching the last moments of a woman's reproductive clock. Life is long enough for practicing any kind of eating or other lifestyle choices, and your last fertile years are probably the time when it is best to stick with proven recipes.

## **“Fertility diet” from the Nurses' Health Study**

If you are trying to get pregnant for longer than several months, then the chances are that somewhere on the Internet you've come across the “Fertility diet.” This set of eating recommendations is based on the results of the Nurses' Health Study, which was published by Harvard researchers in 2008.

The reasons that I mention this nutritional approach briefly is that 1) there are countless magazine articles and even books that cover this diet in depth, and 2) due to the methodology used in this study (self-reported questionnaires filled out by the women themselves), there is actually only limited scientific evidence to prove that it was actually the diet itself that made the difference in nurses' chances to get pregnant. **WAIT, ARE YOU SAYING, HARVARD RESEARCHERS WERE WRONG?**

For sure, not. Only, there is sometimes a discrepancy between the original findings published in the medical journals, and the interpretation of these results spread through women's health magazines. Here is a short summary of the most important facts. The Nurses' Health Study belongs to the largest running investigation ever designed to establish the role of diet and lifestyle factors in common chronic diseases. It was initiated in 1976, with the primary focus of identifying lifestyle factors that could be used in cancer prevention. Over the course of time, this study was largely expanded to include more nurse participants who completed questionnaires on their lifestyle, health, and eating habits. In this way, landmark data on cardiovascular disease, diabetes, and several other medical conditions were produced. Most importantly, the Nurses' Health Study has proven that lifestyle factors, such as diet and physical activity, not only affect, but promote better health in women.

So how about results related to nurses' fertility and getting pregnant?

This part of the findings comes from 18,555 participants who were trying to get

pregnant over the eight-year period covered by the questionnaires. Although the number sounds like a lot, the actual results derive from a closer investigation of 438 women who reported infertility *due to ovulatory disorder*.

Do you see what I am saying?

Although several books have been published based on the eating habits of this limited sample of women, the association between nutrition and fertility is relevant only for this particular aspect of infertility, namely, women who can't conceive due to ovulatory issues. This means that if you are suffering from irregular ovulations, your fertility might benefit most from this nutritional approach.

While I found Fertility Diet useful, my priority was a cross-search across all recommended diets and identifying dietary factors of primary relevance for *women who are generally healthy* and experience delays in getting pregnant primarily due to their age. That's why my focus remained on searching medical databases and identifying foods that slow down the biological clock.

The Nurses' Health Study concluded that women who consumed three or more multivitamin tablets per week had a significantly reduced risk of ovulatory infertility, and folic acid appeared to explain part of this association. Although the means by which folate accomplishes this are still unknown, it is possible that ovaries simply respond better to FSH pulses coming from the brain when more folate is around.

In addition to improving ovulation, supplementation with folic acid has been shown to reduce the risk of neural tube defects and prevent multiple other congenital malformations.

Regarding the diets of the nurses during that time, detailed guidelines on what to eat to improve fertility could not be clearly established. The reason is that the sample of women was limited, and their eating habits self-reported, and this only every few years.



Interestingly, the Nurses' Health Study reported that a Mediterranean-type of diet reduces risk of incident cardiovascular and heart disease and stroke, and particularly recommends the intake of fish, nuts, and whole grains, in addition to reducing refined carbohydrates and trans-fats.

## **Finally: What to eat to improve chances to get pregnant**

We are physiologically adapted to a varied diet without too much sugar, without toxins and additives, and we can cope with irregular meals, or even occasional hunger.

Please take one breath and try to imagine that 99% of our evolutionary time has passed with such nutrition rhythm. This is a very long time during which nature has had many opportunities for trial and error; however, we as individuals cannot afford this time. Therefore, I am convinced that we should adapt our eating habits to better capture this past experience, and benefit from nature's accumulated knowledge, instead of using our short life to manipulate and experiment with anything as important as eating.

In a nutshell, which nutritional approach would I finally recommend to those who are trying to get pregnant? I would recommend the Mediterranean-style of eating, as there is more systematic knowledge behind it. However, whatever you choose to eat, it is important to feel good about it. It is *your* daily supply of energy, and it should fit with your desires and your appetite. Nutrition is important, but so are many other factors. Adjusting only the way you eat would be putting all your eggs in one basket. Women who are over thirty-five need to work at keeping up their fertility on all levels, such as smart and targeted supplement intake, physical activity, and relaxation techniques. The following chapters will focus on those.

# Magic for your eggs

From the perspective of someone who has dealt with vitamins and hormones for over a decade, I am convinced that it is not a good idea to rely on the claims of the food industry that eating “a balanced diet” will provide all the nutrients that our bodies need. What does a “balanced diet” mean, beyond being a phrase? Who feels they know what our individual needs are? Finally, who is telling us what to eat, and based on which evidence?

Our lifestyle has changed radically over the past hundreds of years and our eating habits have become completely disconnected from anything practiced by humans before. We buy our food in the supermarkets as if it were the most obvious thing in the world. It seems unbelievable that the first European supermarket only opened up in England in the middle of the last century.

Although several decades seem like an awful long time, it is, in fact, just a blink of a moment when considered from the perspective of human existence on Earth. Regardless of whether we buy our foods in the supermarkets, thrive on processed food, or believe we eat healthy by being vegetarians, vegans, or whatever else, our collective eating habits are just a recent fashion trend, an evolutionary experiment run by a crowd without much theoretical knowledge, without proper controls, and without a person in charge.

## **Do you need vitamin supplements during preconception time?**

Let’s have a look at what our biological and historical past has to suggest about taking supplements.

Since our ancestors left Africa, roughly 5,000–6,000 generations have passed.

So, imagine giving your hand to your mom, and she to her mom and so on – until an uninterrupted line of over 5,000 women creates a direct line of your descent. All of them are your grandmothers, and your existence as you are today would not be possible if only a single one was missing.

But how did our grandmothers live and love? What could we likely read from their diaries if they left us any? Which prenatal vitamins helped them get healthy babies?

Quite certainly, all our grandmothers (with the exception of the last few generations) were spending much more time outside, in direct touch with the environment, gathering food and other essentials, for either themselves, their children, or other community members.

In terms of biochemistry, a diet based on this kind of living translates into the following differences: a higher nutrient density in foods, a smaller proportion of sugars and grains, an absence of man-made environmental toxins, much higher vitamin D levels, and more intense physical activity, be it through gathering activities, child carrying, or various social activities.

So how does this bring us closer to understanding whether we need prenatal supplements and why?

Our bodies are such beautiful creations that it takes, in my opinion, poetic rather than scientific writing skills to describe their robustness mixed with their fragile perfection. Over an unimaginably long time, they have been, and continue to be, shaped by environmental and genetic forces, as well as pure luck. In fact, the random introduction of extra amounts of *any substance* in a system perfected by nature for so long would always be likely do more harm than good, be it a food supplement, medication, or a prenatal vitamin. Scientific research, as well as carefully controlled clinical studies, almost invariably confirm: targeted vitamin supplementation is of benefit only to those *who are deficient in something*.

But please, keep reading.

After more than a decade of researching vitamins and hormones, I often wonder, which young woman is in such a privileged position nowadays to *not be deficient in something*?

With our meat often coming from animals that were raised under conditions closer to death than life, with our fruits and vegetables from greenhouses often disconnected from real soil and sunshine, with sugar snacks to help us get through our busy days, who can still hope to eat a balanced diet?

Who is satisfied with the fact that hundreds of species of animals and plants that our ancestors could hunt or dig up with a stick, got reduced to just a few kinds of foods, which are mostly genetically manipulated now?

Who thinks that eating a balanced diet means basing nutrition on plants that never existed in nature before being bred by humans some hundreds of years ago or less?

In societies living in places with diminishing natural soils, disconnected from hunting or growing their own food, who has any data on the real nutritional density of the foods to which we are historically and metabolically adapted?

Who feels authorized to put up the dietary recommendations, and based on which benchmarks? And why are dietary recommendations in Europe often very different from those in the U.S.?

How come experts working in top institutions read the same scientific evidence and yet come to different conclusions?

Yes, women do need extra vitamins when trying to get pregnant.

Unfortunately, our bodies did deviate from the metabolic, evolutionary, and physiological milieu they are suited for, and targeted supplementation with certain vitamins can help restore part of that balance, which in turn, improves the chances of conception and giving birth to a healthy baby. On the next pages, you will find more about scientific evidence which proves that.

## Some facts about folic acid

*Next chapters contain information about nutritional supplements as found in recent medical reports and/or used by myself during the time I was trying to conceive. I encourage you to read the sources and the references provided at the end of the book and discuss them with your doctor. For any self-administration, please use your best judgment; also see the disclaimer at the end of the book.*

If you are over thirty-five, trying to get pregnant for a while, and live in a modern Western society, you definitely need prenatal supplements. Besides improving your chances to get pregnant, they will also give the best start possible to your baby, which will need a lot of support (and B-group vitamins!) in order to grow and develop well during the nine months in your belly.

In finding a supplementing strategy that works best for you, you may first want to focus on the “basics”. This means, regular prenatal supplements that provide B-vitamins, including folic acid.

You are free to choose from any of the well-known prenatal multivitamin brands, but make sure they contain *at least 400–800 µg folic acid*. Start taking them at least three months before you try to get pregnant and continue throughout the first few months of pregnancy.

If you can memorize only one single supplement you should not omit during the preconception time, it is folic acid. Taking folic acid in the months prior to conception contributes to the prevention of severe neurological disorders in babies. In this case, your genes and personal sensitivities don't play a role, so your simple decision to take a folic acid supplement can make a huge difference to the future health of your child.

A study published in 2009 in the journal *Midwifery*, showed that in a sample of 588 Australian women who were actively trying to conceive, less than one-third took a pre-pregnancy folic acid supplement! Factors that were associated with an

increased risk of not taking folic acid were income, smoking in mother, and baby being a non-first child.

*This means, taking folic acid already places you in the top 30% of women who are proactive in improving their chances to get a healthy baby.*

You may also want to know of the growing body of evidence from animal studies on the long-term effects of a mother's early nutritional life on later disease susceptibility in her offspring. But what does that mean?

It means that the nutritional milieu in a pregnant mother's uterus induces slight alterations directly on the DNA of her baby (not exactly overwriting it, but adding some extra marks to it - this is called "epigenetic modification"), which affects the offspring's susceptibility to many diseases later on in life. Evidence in human subjects is scant (for moral, ethical, and practical reasons it is not possible to experiment on human babies the way we do with animals).

Before science figures this out, you can keep in mind the known facts, such as during pregnancy, human babies have a high demand for folic acid and other B-group vitamins in order to develop their nervous system properly. So, folic acid is not something you want to leave your young baby without.

However, as important as it is, folic acid is all about your baby and not so much about you.

Because, in order to give your baby some extra folic acid, you need to get pregnant first, right?

So how is the quality of your eggs?

Are they healthy, fit and youthful enough to start a new life?

What can you do to improve their odds of giving you a healthy baby?

Scientific evidence accumulated in the last decade shows that the quality of a woman's eggs can be improved with particular nutritional supplements. The

substances which are discussed in this regard are the topic of the next chapters.

# Sunshine for your eggs

If you are waiting longer to get pregnant, there are several things you can do to maximize your chances of conceiving. One simple and inexpensive option is to make sure you have enough vitamin D. Vitamin D is a substance our bodies naturally produce following sun exposure, so getting outside in the sunshine is a great way to help boost your fertility.

## Vitamin D and fertility

Research on higher apes (our monkey relatives) and hunter-gatherer tribes suggest that our ancestors are likely to have had vitamin D levels more than *three times higher* than humans today, even those of us considered well-nourished and well-supplemented. Think about that for a moment. In terms of body biochemistry, this can make quite a difference.

While science currently does not know exactly what short or long-term consequences reduced vitamin D levels can cause, each year new evidence emerges supporting a connection between vitamin D status and fertility in women.

Vitamin D deficiency has reached epidemic status in Western societies and has been linked to increased risk of cancer, osteoporosis, and decreased chances to get pregnant. A 2010 study led by Dr. Lubna Pal from Yale University, published in the journal *Fertility and Sterility*, found that vitamin D blood level was a better predictor of pregnancy success following in vitro fertilization than any other conventionally-used prognostic parameter. For women undergoing fertility treatments, this means that your IVF may fail just because your body is vitamin D-deficient, even if everything else is in good shape. Dr. Pal suggests measuring



vitamin D as part of a routine infertility workup because “appropriate supplementation of those depleted in vitamin D may translate to an improved fertility outcome as well as improved overall health.”

The current reasoning for why vitamin D is so important is that it may influence endometrial receptiveness, assist with cell divisions prior to ovulation, or play a role in some other physiologic magic we don’t yet fully understand.

But do you need to know all the details behind how vitamin D works to make sure you are getting enough of something so beneficial for your fertility and health?

The good news is that increasing your levels of vitamin D is easy! You can jump-start your body’s natural vitamin D production by spending time outside in the sunshine (both enjoyable and free) or you can take supplements (easy and convenient). Better yet, combining both methods will ensure you are getting enough.

So how much vitamin D does a woman trying to get pregnant need?

What is the minimum level of vitamin D you should maintain whilst trying to conceive?

In the jungle of product-oriented information on the Internet, whom should you trust?

How can you know whether you have enough vitamin D and, if you know you don’t have enough, how much should you take via supplements to bring your body to the optimal level to get pregnant?

On my blog All About Egg Health [www.paleo-mama.com](http://www.paleo-mama.com), you can find a long chapter on vitamin D supplementation, together with current guidelines and references you can follow. Here is a short summary.

## **Clarification of terms**

Before we go any further, let's clarify some terminology. The scientific name for vitamin D is 1,25(OH)<sub>2</sub> Vitamin D<sub>3</sub>. It is often abbreviated as “vitamin D<sub>3</sub>,” “D<sub>3</sub>,” or simply “vitamin D.” I will refer to it as vitamin D from here on.

## **What to test when testing for vitamin D**

If you think you might be low on vitamin D, you can have it checked by a simple blood test. This blood test will measure your blood's concentration of 25(OH) Vitamin D. What is that now?!

Basically, there are various forms of, and precursors to the final form of vitamin D. The best blood marker to assess vitamin D status is 25(OH) Vitamin D, the second-to-last metabolite in the chemical pathway of vitamin D production.

The last time I had this test done in Germany, the lab costs were between 25 and 30 Euro, and some health insurances will cover the cost of it. But even if you have to pay for the test out-of-pocket, this is something that is worthwhile. Think of it as a good investment in your future family.

## **How much vitamin D do women need?**

Given that our bodies are physiologically adapted to function with far more vitamin D than what our lifestyle generally enables us to produce, it is uncommon and difficult to have too much. It is almost impossible to overdose on vitamin D.

It is much easier to slip into the deficiency range and expose yourself to an increased risk of illness, as well as harm your chances of getting pregnant. In terms of vitamin D supplementation, the *benefits of supplementing far exceed the risks of overdosing*—a rare situation in the world of nutrient supplements.

The reason that I stand behind this bold statement is that I've spent many years in vitamin D research and have read many scientific publications surrounding

this issue. In Germany, where there is generally a lot of skepticism around vitamin supplementation, one can sometimes read alarming headlines in the newspapers. But in the case of vitamin D, these articles have little scientific backing.

There is anecdotal evidence of rare but serious cases of vitamin D toxicity, such as babies who got injections of several hundred thousand units of vitamin D on a single day or adults who took supplements of a few million units accidentally. Even in these cases, however, the consequences were mild. Apart from minor issues which were typically stabilized the very same day, no major health consequences were reported.

That being said, I want to add that humans are biochemically individual, and the unexpected can happen, with vitamin D as with anything else. There are no safe substances, only safe doses. As always, benefits need to outweigh risks.

In terms of our current global vitamin D deficiency, it makes simple sense to restore our vitamin D levels to those that better match our evolutionary roots, our genetics, and our metabolism.

## **What vitamin D level should YOU aim for?**

To answer this question, we should take a quick look at the most important functions of vitamin D. The main role of vitamin D is to help us extract calcium from our food. The level of vitamin D (more precisely, the level of 25(OH) vitamin D, the kind that gets measured in the blood, remember?) at which absorption of dietary calcium from the intestine is maximized, is 50 ng/mL.

Similarly, the vitamin D level found to best optimize bone and muscle health, protect against cancer, and contribute to other health benefits in women is 40 ng/mL. Therefore, we can assume that a woman wishing to maximize her fertility should aim to have a 40-50 ng/mL blood level of vitamin D.

## How to improve vitamin D status with supplements

So what should we do if our vitamin D is below this threshold? The recommended daily dose of vitamin D is still 400 IU in most Western countries. In terms of meaningfully improving one's vitamin D status, this is shockingly low.

How did such a low benchmark come to be? Historically, it happened during the early industrialization in England, when children often became sick with rickets, a debilitating bone disease. There it was found that rickets could be prevented by taking one tablespoon of fish oil daily. Much later, scientific research figured out that it was the vitamin D in the fish oil that mobilized calcium and strengthened children's bones. Consequently, the quantity of vitamin D present in one tablespoon of fish oil was set as a daily dietary recommendation. Unfortunately, what worked to prevent many cases of rickets in children proved disastrous as the recommendation for maintaining good health in adults.

So how much vitamin D should you take?

Like in many other issues related to health, the answer is quite individual and there is no dose which fits all. In the case of vitamin D, it depends on your skin color, the amount of time spent in the sunshine, the latitude of the place where you live, and the season (due to the shifting angle of the sun over the year).

All of these factors influence how much vitamin D our bodies can make on their own. If you have darker skin, cover most of your skin with clothing, live in the north, or simply spend most of your time indoors, you are at an especially high risk for vitamin D deficiency, and your chances to get pregnant could benefit greatly from boosting your vitamin D levels.

As a general rule, most women will probably need to supplement about 2000 IU daily to ensure they are not deficient. Fine tuning should be done in collaboration with your doctor. It is a good idea to first *test your vitamin D*

*status*, try a given dose of supplementation, and then re-test after several months to see if that dose is enough for you. Testing a few times a year is the best way to make sure you are not vitamin D deficient.

Being a big fan of living as close to nature as possible, I believe it is best to take vitamin D supplements only in the winter. In the summer, you can simply spend more time outside. Of course, use common sense when spending time outdoors, especially at midday. Protect your skin and make sure you do not allow it to burn.

# Energy for your eggs

## CoQ10: Why you must love it in spite of its weird name

It would take the genius of Stephen Hawking, combined with the writing magic of Stephen King, to make the average woman grasp how *very* important Coenzyme Q10 is for every cell in her body. I don't have such skills, but still wish to bring you a bit closer to that understanding.

Every move you make, every thought which crosses your mind, virtually nothing in terms of you being alive happens without CoQ10.

It is an essential part of an energy-generating system that fuels each and every movement of your body. Interesting thing about CoQ10 is that its levels decline as we age. Without any special reason or conspiracy behind it, CoQ10 just becomes less as we get older, like many other compounds. DHEA is another example and will be discussed in the next chapter.

Eggs need a lot of CoQ10 when getting ready to ovulate. They need even more CoQ10 later on, when they become fertilized and must grow an embryo at high speed, while at the same time searching for a spot in your uterus to nest and develop into a baby.

Now, imagine what happens when, after having slept within your ovary for decades, your eggs wake up to the FSH call from the brain (remember FSH from the chapter "Ovarian reserve"?). What will they need *first*?

What is *your* first need when you wake up in the morning?

Some kind of a breakfast, I suppose? Well, your eggs are no different than you – in fact, they are the best and the most intact part of you.

So where is the breakfast, the energy for your ovulating eggs, supposed to come from?

From mitochondria, of course. What is that? And what does it have to do with CoQ10?

Let me try to explain.

First, imagine your eggs as little plastic bags full of water. In healthy eggs, there is plenty of stuff swimming around in this water, and some of it resembles hundreds of rice corns scattered all over soup. *Those rice corns are the mitochondria.* For simplicity reasons, if you imagine your ovulating egg as your favorite handbag – mitochondria would then be your car keys, your mobile phone, and all other items which are important in the bag. Mitochondria are everything you can't afford not to care about.

In reality, mitochondria look quite funny. These tiny particles, shaped like rice corn, have a double layer of skin and the *inner layer* is quite wrinkled! Inside mitochondria, there is a lot of movement, and a life of its own is going on in there. Many ingredients keep going back and forth through this inner skin; there is a lot of jumping, shifting, and chaotic bumping all over the place. Certain molecules prefer only one side of the membrane and become cluttered there; this, of course, creates tension. That is enormously important because this tension gets resolved by mitochondria releasing lots of energy.

This energy is delivered in the form of one smart, generic, universally present molecule called ATP (maybe you've heard of it). This is ultimately beautiful because ATP is something like a basic energy credit – produced in the mitochondria, but it can be spent anywhere else in the cell, or get transported, or stored for future use. Like a Skype credit – as long as the bits of money get transferred to your Skype account, you are free to Skype from any location you like. You can phone and connect with those you love from any remote Internet café, and it will work as long as your bank account keeps providing fuel to other

services.

In summary, mitochondria are the power plants inside every cell, and this is where CoQ10 comes into play. Inside each mitochondrion, many CoQ10 molecules sit in its inner wrinkles, helping to create the tension. In biochemistry books, this is called the “electron transport chain,” and no matter how many years you spend familiarizing yourself with this topic, at some point you look at those ugly, typically black-and-white pictures and only think, Jesus Christ!

*Bottom line is: Mitochondria need CoQ10 to be able to create energy for your cells.*

## **Why tired eggs don't give babies**

Now, it is not like mitochondria wants to give your eggs all this energy, or doesn't want to give your eggs energy, or even cares about it at all. It just happens that mitochondria work in this neurotic way. And we benefit from it big time.

Once upon a time, many billions of years ago, mitochondria were independent from us and lived their own life as some sort of little bacteria, until it became clear that our big cells, with their high-energy demands, could benefit a lot if they teamed up with mitochondria, with their energy-transforming ability. So they did! Mitochondria saw their own interest in that community – our huge cells provided shelter, living space, and even ingredients for them to convert into energy units for us.

Ever since, dozens, or many more mitochondria have lived in *each one of our cells* and the cells of almost all other living things.

Mitochondria are like little dragons, spitting fire, and we owe them a lot for that. The more energy-demanding job that a cell does, the more mitochondria it needs. That's why our hearts have many mitochondria, and ovulating eggs and



fertilized embryos are kingdoms of mitochondria.

When it comes to managing your egg quality, by now you've realized that it is a lot about mitochondria being able to generate tension because *without tension, there is no energy*.

Without energy, there is no healthy egg. And without a healthy egg, there is no timely ovulation, no good embryo, no good implantation, no happy fetus, and no healthy baby!

## **Where do eggs get their energy from?**

As we age, our bodies accumulate toxins, mutations, and all kinds of cellular damage. This inconvenient truth goes for mitochondria, too – by the time a woman reaches forty, almost *one third* of the mitochondria in her eggs are no longer efficient energy producers. Remember how I previously mentioned that mitochondria were once independent from us? In fact, they are still able to reproduce and take care of their own survival. This means that mitochondria have their own genetic code, their own useful proteins, and even some more useful stuff, and they use these facilities all the time - every day and in every one of your cells. Unfortunately, by the time we get to our forties, some parts of the mitochondrial machinery don't sit so well anymore. Often they contain a 4479 “common deletion” (this number is referring to how many building blocks of their DNA are removed), meaning that a *huge* chunk of information - almost one third - is missing from their genes, making them less functional.

I would say, it is quite a wonder that they still produce enough energy to spark a new human being. Don't you agree?

Understandably, when mitochondria become less functional, this will reflect on egg quality. That's why women over thirty-five need to supplement CoQ10 to keep mitochondria fit and their eggs in the best shape possible.

## **Decreased egg quality is a natural part of getting old**

For the reason that processes related to mitochondria were first described either by scientists or by medical doctors, their names often sound like abbreviations, hard to understand for anyone with less than twenty years of education in life sciences (CoQ10, ATP, mitochondrial disease).

In reality, most often there is no serious health issue behind damaged mitochondria. Lowered egg quality and decreased fertility is a natural part of getting old.

So what can you do about it?

In terms of energy production, aging mitochondria become less effective at supporting biochemical processes taking place in the egg. The only way to partially counteract this is to *provide the missing components yourself*.

Done right, this will enable your remaining eggs to accomplish energy-intense processes, such as ovulation, fertilization, and supporting early embryonic development.

So how much extra CoQ10 should a woman take, when, and for how long?

To better understand that, let's take a quick look at the moment of conception.

## **What the moment of conception REALLY looks like**

Imagine the following scenario: One of your eggs has been fertilized.

This means that one small, dry DNA package, brought by the single most successful sperm, was delivered, and your big, fat egg let it into the house. This is not how most people imagine the moment of conception, but that is exactly what the proportions are – *the glorious moment of unification looks rather like a letter slipped under a door*. This letter is a package of your dad's naked DNA.

The house is your egg. In there *you* will provide all the food for your embryo to

survive the next few days, before it grows big and strong enough to attach to your uterus wall.

You have prayed and waited so long for this fertilization event to happen; now, you only have to wait two weeks until your pregnancy test, and then, fingers crossed, everything goes well in the next nine months. Finally you can lean back and start reading much easier and more enjoyable kinds of books, and leave all this egg science to other women who were not so lucky yet.

But wait.

## **Your baby needs you most before you know of it**

Does your body have enough food to support a growing embryo? Do you know that in the days right after fertilization, the embryo will have no other source of energy, apart from what is generated by the mitochondria that were in mom's egg?

Can you imagine that?

Those decades-old mitochondria from your fertilized egg will be all the fuel your baby gets before it connects to your uterus! Here, we are speaking of days during which the embryo is on its own. This is the point where strong selection pressures and elimination of the weak takes place. Those who survive will finally attach to mom's body, but that process can take anywhere from three to ten days.

After implantation, life becomes easy because mom's whole body is there to provide food day and night. But just before that happens, the life of an embryo is very fragile; these first few days determine whether the embryo is robust enough to continue its journey to the uterus. A lot of natural selection takes place, and only the fittest survive.

That's why every embryo needs a mom with good mitochondria and plenty of

other food supplies.

Right after fertilization, mom's body works hard to increase the number of mitochondria in her egg. However, if most of them were damaged before fertilization, early cell divisions (an energetically costly process, in which mom's and dad's chromosomes repeatedly make new copies of themselves, align, and separate) will become messed up, and embryo loss is likely to occur.

For those who looked forward to becoming mothers and waited impatiently to get pregnant, is it a terrible thought that your few-days-old embryo is not getting enough energy to survive the first days of life?

But did dad bring any mitochondria?

No, he didn't.

I know it is hard to believe that the father does not contribute any "food" for the "child" at this point. When I say that, most of my friends reply with: Really? No energy comes from the father. Are you sure?

Yes. The sperm's mitochondria got used during the long journey and never came into the egg. The embryo has no energy supply of its own at this early point.

While it is true that our genes, in terms of the DNA information that defines who we are, come in equal amounts from both our parents, all other commodities that the embryo utilizes in the first few days come from the mother.

Hard times for a young embryo, right?

That's why it is better for any embryo to have a mom who is young, with mitochondria that are still healthy and numerous. There are benefits for embryos coming from young mothers, and mitochondria are one of those benefits.

## **Not only eggs get tired as women age**

The perspective of looking at early fertilization processes less from a

mechanistic and more from an energy point of view has brought a whole new twist to the field of fertility research. In its simplified form, here is why.

Until recently, women's eggs were viewed somewhat like kitchen cook-timers, set for a certain period of time (about forty years) and then decaying or becoming useless after this time was over. In addition to being psychologically devastating for women, this vision turns out to be plain not true. We now know better. I am very happy for that, and you should be, too.

Decades of intense research and manipulating eggs in the lab have helped us arrive at a more informed picture. That picture shows that we should not put the entire responsibility for not getting pregnant on the eggs. As a matter of fact, the "tired" and burned out environment around the egg also seems to be a big challenge. This means that mitochondria from the neighboring tissues (ovaries, tubes, and uterus) do not possess sufficient energy to support early embryonic development. In particular, CoQ10 may improve mitochondrial energy levels in maturing eggs and developing embryos, increasing the cell division and implantation rates in older women.

Current evidence suggests that 600 mg CoQ10 taken daily over several months brings significant improvements in egg quality. Those most likely to profit from targeted CoQ10 supplementation are older women and women with a diminishing egg reserve.

A 2010 study conducted at TCART (Toronto Centre for Advanced Reproductive Technology) presented evidence for mitochondrial involvement in age-related changes in women's eggs. Research teams headed by Drs. Bentov and Casper suggest that mitochondrial nutrients should be used as an adjuvant therapy in older women who have difficulties getting pregnant. I cite: "...we believe that supplementing the diets of older women with mitochondrial nutrients may result in an improvement of egg and embryo quality, and subsequently, better pregnancy outcome."

Mitochondrial nutrients (CoQ10 being the most important one, and I will mention a few more further on) are naturally occurring vitamins that have been used successfully to treat conditions associated with diminished energy production from mitochondria and appear to be very safe in the doses studied.

A randomized, placebo-controlled study was initiated in 2009 to test CoQ10 effects on pregnancy outcomes in older women (age thirty-five to forty-three years). The trial failed to be completed due to recruitment issues; namely, potential participants (older women) did not wish to waste time and take the risk of being in the study's placebo group. Another issue is that CoQ10 is a substance already marketed as a food supplement. There is only a limited interest in investing resources in clinical trials with a compound that is not novel and cannot be patented. One further study on the CoQ10 was initiated by Hadassah Medical organization in 2012, with the goal to explore energy production in eggs from women of older reproductive age. Investigators planned to supplement 600 mg of CoQ10 daily, beginning three months prior to fertility treatment, and check outcomes such as energy production levels, embryo quality, cumulative pregnancy, and live birth rate. Large trials like that easily take two years or more, and we can cross our fingers for more new babies due to more CoQ10 research.

In a nutshell, the distilled message to take home from this chapter is that research in the area of improving women's egg quality is making progress. This is a big step forward, given that only a decade ago most people believed that the quality of women's eggs was predetermined and could not possibly be changed by any means. Luckily, targeted CoQ10 supplementation is making its way into clinical practice and a few other hopeful candidates are progressing through the pipeline of egg research, giving hope that egg quality can be positively affected not only in women whose ovarian reserve is diminishing due to advancing age, but in all women who want to maximize their chances to get pregnant.

**Ubiquinol or ubiquinone: Which CoQ10 supplement should you**

## **take?**

One of the questions I get asked most often on my blog is, which form of the CoQ10 should be taken, because two exist on the market: ubiquinone and ubiquinol. In a simple form, the answer could be summarized like this:

In the body, CoQ10 exists in two forms; the oxidized one is called ubiquinone, the reduced form, ubiquinol. When oxidized CoQ10 (ubiquinone) accepts an electron, it becomes reduced (ubiquinol). In the same way, when ubiquinol donates an electron, it becomes ubiquinone.

Most of the older studies, which demonstrated that CoQ10 had beneficial effects on the heart, brain, and kidneys, had used the ubiquinone form. Then at some point, people figured out that the bioavailability of the ubiquinol-CoQ10 is even better (it gets absorbed more easily and utilized in the target tissues). That's why nowadays it is considered that the optimal way to supplement CoQ10 is to take it in the *ubiquinol form*. Some supplement producers claim that the ubiquinol form of CoQ10 is five to eight times more potent in reaching the therapeutic effects, such as is needed for improving egg quality and health.

## **A few more egg-friendly ingredients**

Luckily, there are more compounds than just CoQ10 that can improve your egg mitochondrial status, such as alpha lipoic acid, acetyl L-carnitine, and various plant antioxidants. However, research on their exact effects on the ovarian tissues is still in its infancy, and I will do my best to let you know if some exciting data comes out in the future.

# Youth for your eggs

## Egg booster DHEA

If you're over thirty-five and waiting to get pregnant for longer than a few months, chances are that somewhere among the forum threads, you've come across women mentioning DHEA. The real name of DHEA sounds scary: Dehydroepiandrosterone. But everything else about DHEA is actually quite nice. Here are the highlights:

DHEA is produced naturally in our adrenal glands in large amounts. Some women are surprised to hear that, as they often expect a synthetic compound to hide behind that name. The reason why our bodies need a lot of DHEA is because *it is a basic building block* for most sexual and steroid hormones. Hormones act as important messengers and affect how we act, feel, and sleep; they drive our immune response and basically every other function in our body.

Remember how I told you that CoQ10 levels decline with age? DHEA is very similar; it peaks in our bodies between the ages of twenty to twenty-five and then declines at a rate of about 20% per decade, falling in the elderly to levels of less than 10% of initial values. So if you are trying to get pregnant at the age of thirty-five and above, there is less DHEA for your ovaries to work with from the beginning.

The fact of life is that the decline in DHEA coincides with us getting old, so if you want to increase your fertility at that age, you will most likely need to supplement DHEA to bring your eggs and ovaries to the best form possible. However, please make sure to read and understand the entire chapter. If you have any medical conditions, you should talk to your doctor before self-administering DHEA or anything else.



I often get asked whether DHEA itself is a hormone, as most women feel uneasy with that word and would not supplement any *hormones*. As you may have already realized, the answer is yes and no. Yes, in the sense that many hormones are built by using DHEA as raw material, and no, in the sense that DHEA itself is not some crazy steroid you should be afraid of.

DHEA is simply an important building block. You would be best off imagining a DHEA molecule as a kind of basic IKEA flatpack piece - a Billy bookcase which easily becomes transformed through simple biochemical steps into a range of compounds.

The nice thing is, cells suck up DHEA directly from the blood and decide themselves what they will transform it into. And if those cells are your eggs getting ready to ovulate, you need to make sure DHEA is available when they look for it.

DHEA has come a long way in only about ten years of fertility research - from a coincidental finding to more systematic studies to recent large, independent, clinical trials. DHEA is now officially sitting on the negotiation table. Women can feel happy and grateful to have at least one compound on their side which can help us slow down our biological clocks.

This may not work for all women, or you may succeed in slowing your clock for only a few minutes, but these minutes could mean all the difference. So what are the effects of DHEA on aging eggs?

## **DHEA: One courageous woman makes a discovery**

The story behind the discovery of DHEA made me cry when I first read it.

There are discoveries in science which come after a long period of systematic research, like deciphering the human genome. Others are due to errors in the lab, like the discovery of several artificial sweeteners. And the vast majority of

groundbreaking discoveries can be attributed to pure chance.

However, in the case of DHEA, it is quite different. It's a story of persistency, despair and the strength of one single person. Medical literature nowadays calls her *DHEA Index Patient*.

The story started when this courageous Northern European woman decided it was time for her eggs to make babies. She went to a private IVF center to initiate fertility treatments. She was almost forty-three years old and single at the time.

It turned out she waited too long; her eggs were already gone, almost all of them.

According to the report, the name of her condition was “severely decreased ovarian reserve”. Attempts to retrieve her remaining eggs started with FSH of 6,2 IU/L (FSH is a marker of ovarian reserve, remember?), and going up to 15IU/L within one year of treatments. Increasing FSH is a typical sign of women approaching menopause and a small reminder of how quickly eggs disappear at the end of reproductive age. The chances that repeated fertility treatments would result with enough eggs and embryos to get her pregnant some day were, at best, very slim.

This she took as an incentive and did something remarkable. She started researching, asking, and learning, until she figured out what to take to rejuvenate her decade old eggs: DHEA.

But how did she come to that idea? What made her believe DHEA would work for her? Was it her strong determination to become a biological parent? Was it her exceptionally stubborn personality? (We are speaking of prior to 2005, when Google and Medline were displaying a completely different reality when one searched for the term DHEA).

Soon after starting fertility treatments, she began with self-administration of 75 mg per day of oral micronized DHEA and she also initiated acupuncture treatments (more about acupuncture in the chapter titled “Relaxation for Your

Eggs”). In the IVF cycles to follow, her estrogen values (which are predictive of how many eggs respond to hormonal stimulation) improved, becoming as much as eighteen times their original values. Something was going on! Eggs were popping up; her decades-old ovaries were up and running at a time when all odds were speaking against it.

The woman continued with DHEA, acupuncture, and retrieving more eggs. Her ninth IVF cycle resulted in the retrieval of seventeen eggs, which together produced sixteen embryos which she decided to freeze for future use. Wow!

Now sit down please.

How many embryos did this courageous woman bank altogether?

Sixty-six.

?!

Why so many?

Because she was single at the time and wanted to have enough embryos frozen to get pregnant at some later point.

So when did she finally get pregnant? I don't know. Medical journals didn't follow her story further. But someday I definitely want to find her and give her a hug.

## **Recent scientific reports on DHEA**

Case studies like the DHEA one make great stories, but in terms of science, they have almost no value. So let's have a look at where DHEA research went after this initial finding.

In the review paper on DHEA published in *Reproductive Biology and Endocrinology* in 2011, Drs. Gleicher and Barad from the Center for Human Reproduction in New York took a look at the scientific data on DHEA from 1995

until today. Altogether, they cite sixty-four publications, summarizing all DHEA data relevant for fertility research, regardless of the format of the study. Here are some of the highlights:

- 1) Ten years following the success story of DHEA Index Patient, approximately *one-third of fertility clinics* around the world include or recommend DHEA supplementation for patients with diminishing ovarian reserve.
- 2) Cumulative evidence suggests that DHEA supplementation improves both the quantity of eggs which mature to ovulation (this is called “follicle recruitment”), as well as embryo quality (measured as “embryo grades”, “average embryo scores” and “total embryo numbers”).
- 3) DHEA improves eggs in both quality and performance and results in increased pregnancy success in women where diminishing ovarian reserve or poor egg quality were the issue.

How much DHEA did women take and for how long?

In most studies, women took 75 mg DHEA daily. The effects of DHEA occurred relatively quickly, sometimes after only two months, but peaked after around four to five months. Therefore it is essential to give your eggs and ovaries sufficient time before trying to get pregnant.

Recently, enough DHEA-pregnancies have been examined in a combined effort between the fertility centers in New York and Toronto, to allow for a statistically robust analysis of miscarriage rates. As you know, miscarriages become more frequent with a woman’s advancing age. In almost two-thirds of cases, miscarriages are associated with chromosomal abnormalities. This means that huge chunks of DNA become misplaced during cell divisions, which occur at a fast rate and consume a lot of energy in the early phase of embryonic growth.

Depending on the statistical method utilized, pregnancy loss after DHEA supplementation was reduced by 50-80%. This means DHEA not only helps

women to get pregnant, but also enables them to *stay* pregnant. How this exactly happens science still needs to find out, but it appears that DHEA helps embryos to have more accurate cell divisions and regular growth during their early development.

### **How much DHEA is too much? Who should take it? And what about side effects?**

The most successful studies reported women taking 75 mg DHEA daily and utilizing simple, over-the-counter available food supplements (for any self-administration of DHEA as well as other supplements cited in this book, please consult your doctor and see disclaimer at the end of the book). However, there is still a lot of confusion going on. For example:

- 1) In the USA, food supplements are not strictly regulated by the FDA, making it possible for inconsistent products to appear on the market.
- 2) Some studies also report pregnancy success rates with 50mg daily doses of DHEA.
- 3) There are no clear guidelines on maximum dosage. One study performed at the reproductive medicine department at UCLA in 1998, aimed to assess the effect of supplementation with larger oral dose (100mg) of DHEA in both women and men. After six months, prolonged DHEA supplementation in women restored serum DHEA levels to those of young adults. Interestingly, this result was gender-specific, and no change was detected in men. Neither gender had changes in basal metabolic rate, bone mineral density, or lipid profiles. *No significant adverse effects were observed.*
4. In some countries (like Germany), DHEA is not regulated as a food supplement and needs a prescription, which leaves women with an uneasy feeling when self-administering and purchasing it through the Internet.

According to the report in *Biology and Endocrinology* and the references within,

side effects of DHEA at dosages of 50-75 mg are insignificant and rare. To date, combined data from several institutions mention only occasional reports of oily skin, acne, increased sweating, and even more frequently, improved energy levels and better sex drive among women subjects.

Supplement potency can vary depending on the manufacturer. Therefore, if you are taking DHEA for a long time and want to be on the safe side, you can ask your health provider to monitor your total testosterone levels. The goal is to maintain total testosterone at normal *young adult levels*, greater than 30 ng/dL (D. Barad, personal communication).

What DHEA exactly does to woman's eggs, how it improves pregnancy changes and lowers miscarriage rates is, ultimately, still unknown. But do women who are over thirty-five or otherwise impatient to get pregnant need more evidence, or should they wait for every mechanistic detail to be worked out? DHEA, CoQ10, and vitamin D are safe and helpful in improving pregnancy rates. So make sure to give them a chance to improve yours.

# Quality comes from within: Omega-3 and -6

Remember when we started talking about DHEA and I told you to imagine it as an IKEA Billy bookshelf? It's similar with omega-3 and 6, only they don't belong to interior design, but are part of the *walls of your house*. Your body has billions of cells. Each cell you can imagine as a small house—there are walls on the outside and you don't want to compromise on their quality.

There are things which are common to all walls, and this goes for your cells too. You need good foundation, bricks, and other high-quality stuff in-between. The quality of the wall is tested by seeing whether it is warm or cold in the room, whether you can hear your neighbors arguing, and the kind of atmosphere you have in your home.

Omega-3 and 6 are your bricks. Every cell is a little house, and its walls separate and connect it to the outside world at the same time. Unlike real bricks, which are solid, omega-3 and 6 are fats which make these walls partially fluid. This is beautiful as it enables much more movement and flexibility. By the way, cell walls are called membranes.

In the membranes, one also finds all kinds of funny-looking objects sticking in and out from both sides. Whether you imagine them as little bread crumbs, clumps, chunks, or conglomerations of other funny objects, you will be right. Often they just sit around, or wave in and out with their little antennas, or exchange and pump stuff in and out of the house. This is how cells talk to each other. There is a whole lot of communication going on in this small, friendly world.

Anyway, you want to get your bricks right.

Both omega-3 and omega-6 belong to the kind of fat that gets converted into several really useful and important molecules in your body. In a very simplified form, you can imagine that omega-3 becomes products which support *regenerative processes*, whereas omega-6 converts into *pro-inflammatory* and blood clotting molecules (the body needs those, too).

## **Keeping omega-3 up while driving omega-6 down**

Now we get to the real issue related to omega fatty acids. You have to make sure to not only have enough omega-3, but also to have not too much omega-6 in your walls. It's a ratio of omega-3 to omega-6 which decides on the quality features of your cell membranes. This means that eating fish or taking extra omega-3 will have positive effects on your eggs only if you make sure to wash away any excess of omega-6 and keep it relatively low.

*This is a lot of information.*

I know this is a lot, but it's important that you understand this part. Omega fatty acids determine the quality of cell membranes, which in turn, affects the way cells communicate with each other. For your eggs, communication with their environment is essential. The same is true for embryos, especially in the first days of rapid growth when they are looking for a spot to nest in your uterus.

High omega-3 and not too much omega-6 is essential if you want to have healthy and fit eggs because only sufficiently healthy and fit eggs can turn into babies.

How do I know if I have excess omega-6?

Most likely you do, as it comes easily with fast, processed, and fried food. As opposed to omega-3, which comes from the fatty fish (and not only fish, as there are also good omega-3 substitutes from certain plants for the vegetarians), omega-6 is heavily present in most industrial oils, such as corn and soy oil.

That's why consuming foods prepared with these oils shifts the ratio of omega-3



to 6 in the opposite direction from what our bodies evolved with.

As discussed throughout the book, currently we don't have any approach which would *guarantee* the delay of ovarian aging or methods to improve egg quality. However, the combined effects of nutrition, active lifestyle, and targeted supplementing are likely to be very helpful in most women. A study published in *Aging Cell* in 2012 showed that in animals, even a short-term diet rich in omega-3 fatty acids was associated with improved egg quality, in contrast to omega-6, which decreased it.

Further, a Dutch study published in *Fertility and Sterility* in 2011 found that increased omega-3 intake during preconception improved embryo morphology in women undergoing IVF.

Given the role of omega fatty acids in cell communication, you will not be surprised to hear that omega-3 affects behavior, and attention-deficit hyperactivity disorder (ADHD) was associated with decreased blood omega-3 levels.

## **Foods of our ancestors were low in omega-6**

Anthropological research suggests that our hunter-gatherer ancestors consumed omega-6 and omega-3 fats in a ratio of roughly 1:1. Throughout four to five million years of hominid evolution, grains and seed oils did not play a big role in nutrition. The foods of hunters and gatherers were relatively low in omega-6.

With onset of the Industrial Revolution about 150 years ago, consumption of omega-6 increased, shifting the ratio of omega-6 to omega-3 dramatically. This change was due to the intake of vegetable oils and the increased use of cereal grains as feed for domestic livestock, which in turn, altered the fat profile of meat.

According to the Mayo clinic, people in Western societies nowadays consume

roughly ten times more omega-6 than omega-3 fatty acids. Not surprisingly, a study published in *Human Reproduction* which examined the fat composition in human eggs found similar results. These results indicated that omega-6 fatty acids were 7.73 times more abundant in eggs which failed to be fertilized.

Because omega-6 and omega-3 compete for the same tools in the body, which convert them to active metabolites, benefits can be reached by decreasing omega-6 or, even better, by increasing the intake of omega-3 fatty acids.

Is it enough if I only take omega-3 supplements?

Most likely not. If you want to have healthy eggs, you need to supplement omega-3 *in addition to reducing omega-6 fatty acids*.

For me, reducing omega-6 was the hardest part of changing my lifestyle. I had to stop consuming industrial meat and fast food on the streets of Berlin. Bye-bye, fried potato chips, and bye-bye, sausage in white bread.

As opposed to decreasing omega-6, increasing omega-3 is easy.

There already exist two major types of omega-3 fatty acids: docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). The World Health Organization and governmental health agencies of several countries recommend consuming 300-500 mg of EPA plus DHA daily for healthy women. It's up to you to decide whether you prefer eating fatty fish, taking supplements, or combining both.

Vegetarians can increase omega-3 from plant-derived sources (this one is called alpha-linoleic acid, ALA) such as tofu, soybeans and flaxseed oil, but there are reports that ALA might be less potent than omega-3 from animal sources.

*Whichever supplements you choose to take, keep in mind that it is not only the quantity of omega-3 that matters, but rather fixing the ratio of the two building blocks, which primarily means reducing omega-6 amounts as well.*

This is easily accomplished by avoiding fast food and vegetable oils such as sunflower, corn, soybean, and sesame oil, and using butter, lard, flaxseed,

coconut, and olive oil instead (the last one being very good for cold cooking and salads). Only this combined strategy will provide good-quality building blocks for your cells, eggs included.

# Yoga for your eggs: How to relax while waiting to get pregnant

Waiting to get pregnant can make your inner peace go “*boing*”.

We are genetically hard-wired to want to have children. Trying to have them and not succeeding can feel like being insulted by the entire Universe.

Everything in the world seems to be about reproducing: birds, bees, ideas, and all of our old friends anyway. When I started trying to get pregnant at thirty-five, one of my best friends was already working on her third baby while going for a hiking trip and doing other fun stuff with two older ones. Almost all women I knew were in a similar baby-growing mode. Only I seemed to be doing something wrong. Or have I done something wrong in my past life? How could it otherwise be explained?

For those trying to get pregnant for a longer duration, life can really feel unjust. This is especially true on some days of the month. This is no wonder—wanting a child and not having one is simultaneously pushing all kinds of buttons in our minds: social approval, a relationship test, inner programs set to support parenting, and many more. Part of the reason why prolonged waiting to get pregnant is causing a lot of stress and anxiety is that something that important is entirely not under your control—not only that, you don’t know when it will happen, and you don’t know whether it will even happen at all.

It is really not easy to *not* go insane. Yes, it's that hard, and if you know women who are waiting a long time to get pregnant, you should have no illusions about how they feel.

For that reason, anything that helps reduce tension should be practiced in huge

amounts during this phase: walking, yoga, meeting friends and family, reading, whatever works best for you. Be good to yourself and don't feel guilty about it. Practice mindfulness in whatever you do. (And please don't expect *me* to tell you how to do that; there are really great books out there written on that topic). Some women prefer shiatsu massage; some feel better by practicing Qigong. One friend of mine rediscovered her belief in angels.

Find the relaxation techniques that work best for you and *relax*.

## **Fertility massage**

One pleasant way to cut tension while trying to get pregnant is the fertility massage.

For this, you can hire a practitioner, or watch one of the many good YouTube videos on how to perform a fertility massage. In my opinion, women have a better feeling of their own abdomen themselves and can probably relax better in the sauna after a workout, or in the privacy of their own bathroom.

Massaging your ovaries, uterus, and the whole abdomen is best done in the days prior to ovulation. If done right, it may help the digestion, elimination of toxins from the body, and ease the blood flow to the ovaries.

We are genetically programmed to be afraid of seeing blood or even thinking about it. This is sometimes a pity, as blood means life, food, and air for your every cell. Instead of imagining blood, you can take a deep breath and visualize waves of positive energy reaching your ovaries. Imagine your eggs waking up, and try to connect with them and send them love.

Tell them it is okay to be pregnant. Tell this also to the rest of your body.

Keep repeating this from cycle to cycle. Touch your own inner walls. Visualize the inside of your uterus as a sunny beach, and welcome the embryo to find its place in the sand.

Do you now wonder about this sudden exotic twist in a book so loaded with science?

But here comes more:

Meet your past and your present. Love yourself as much as possible and then feel how that's only the beginning. Help your body find its way to health, and this will often be the way to maximal fertility as well.

## **Can acupuncture increase chances of getting pregnant?**

Women who are in fertility treatments might have heard of acupuncture improving implantation chances of the embryo. Apparently, there is sporadic evidence of improved pregnancy outcomes in women undergoing IVF if they went to at least one acupuncture treatment following the embryo transfer. Such claims are serious, and lately there have been many attempts to test them by scientific methods.

The theory behind the needles and babies goes like this:

Acupuncture mediates neurotransmitter release, resulting in the stimulation of hormones from the brain. Release of what?!

Neurotransmitters are important molecules, something like words which parts of our body exchange in process of talking to each other. Sometimes those parts are not physically connected; in that case, neurotransmitters are something like Facebook status updates: If the message they convey is convincing enough, there will be hormones released and buzz created all over the body, and the original message gets amplified.

*So, if acupuncture can affect neurotransmitter release, it will have an automatic impact on many other processes, too.*

Further, acupuncture may also stimulate blood flow to the uterus. Therefore, a

hypothesis arises that, applied in the days before the ovulation, acupuncture may have a beneficial effect on egg and embryo quality.

To clarify this issue further, a recent study published in 2013 in *Human Reproduction* investigated the effects of acupuncture on pregnancy rates among women undergoing IVF. Sixteen trials with 4,021 participants altogether were examined, but no statistically significant difference could be found between the pregnancy rates of women who had acupuncture versus those who did not. Given the number of trials and participants, the results turned out surprisingly negative for the acupuncture treatment; however, these results were smoothed by the suggestion that the effects of acupuncture may have been easier to measure in smaller trials.

Next, a 2013 study published in *Acupuncture Medicine* (acupuncture seems to be a hot topic!) focused on the effects of acupuncture on women with PCOS. Results of this study showed a higher number of good-quality embryos in the group of women who received acupuncture in the days before ovulation. As there were no other treatment differences among the groups, this could translate as acupuncture having a beneficial effect on embryo quality (or maybe egg quality?). However, there was no difference in the final percentage of ongoing pregnancies between the group receiving acupuncture and the group that did not receive acupuncture.

Another recent study published in *Fertility and Sterility* (2013), describes the results for women receiving acupuncture one day following embryo transfer. In spite of meta-analysis (particularly rigorous standards for data analysis), no significant improvement in terms of pregnancy rates could be found in the group that received the acupuncture treatment.

Together, despite some evidence suggesting beneficial effects of acupuncture on IVF success rates, recent clinical trials could not duplicate these effects. For that reason, science now suggests that any apparent benefit of acupuncture treatment

is likely explained by a placebo effect. But it would not be the first time that science was wrong, or did not use right methods to investigate a phenomenon. I look forward very much to new developments in this area.



# Communication for your eggs

## Waiting to conceive feels like a tunnel

Typically, when women start trying to get pregnant, everything feels so exciting and full of possibilities. However, if getting pregnant takes a long time, impatience can start to become so enormous that planning around pregnancy overruns all other activities. Finally, life becomes like a tunnel in which at some point things from the environment disappear or become irrelevant, and what counts becomes only the light at the end, the light of becoming a mother.

The longer women are stuck in the waiting tunnel, the more their senses for the outside world become reduced, and the feeling of having to fight and struggle takes over. In this chapter, I wish to discuss how important it is to communicate and find a way out of the tunnel. I hope I can give you enough examples to inspire you to take action where necessary.

## Your man: Take him by the hand, make him understand

Waiting to get pregnant can turn into a story of failure management for many couples, especially those who were only successful high achievers before.

While waiting to get pregnant from month to month, the initial wish to have a child can change from a desire to an obsession. At some point you will want nothing else but to know how it feels to hold your baby, to hug your child. You dream of that little face, with eyes like yours and lips like those of your partner. You make plans to progress with your career, but hope at the same time to get a reason to take a break from it.

Yes, it can really be that hard at times. I deeply admire all those people who are stuck in a waiting tunnel for what feels like a lifetime and still manage to keep their mental integrity together.

Relationships often change after the baby project has started, so simply talking and admitting that there might be some difficulties with getting pregnant is already a huge step in a relationship. It's essential that both sides accept this new aspect, talk about it, and share their feelings. Waiting a long time to get pregnant can push both men and women to their limits, and no matter how long the couple has been together, they will likely discover new things about each other with every new month of waiting.

Sometimes ordinary situations turn into great pain. What is it that hurts most?

When your period starts again after being late for several days and you were sure you were pregnant this time?

Being happy when your friends are getting pregnant?

Visiting children's birthdays?

Although hard, this is still easy compared to the roller coaster experienced by couples who may have been waiting much longer to get pregnant, maybe for years. They often have to cope with challenges like these:

How to put your mind together and go on with work and life after another round of IVF fails?

Are there egg donation programs available in our country? Can we afford them?

Do we both want to consider adoption? Can we say goodbye to becoming biological parents?

How far are we ready to go in order to have a child?

No matter how well a couple copes with waiting, situations will still arise which can exhaust you and throw dynamite into your relationship if you are not

prepared. Here are some possibilities and ideas on how to deal with them:

No matter what comes next—mood swings, negative pregnancy tests, or a real infertility diagnosis, keep talking to your man. Give each other support and love. Enjoy knowing that *you already are a family*, and you are only working on becoming an even bigger one. Especially when it comes to issues like visiting fertility clinics, or open discussions with friends and family, it is hard to be sensitive enough to your partner's feelings.

Not being able to get pregnant and the *uncertainty of not knowing whether it will ever happen* is an issue so strong that it does not leave any relationship unaffected. Paradoxically, the incapability to make a baby together can open up unexpected possibilities of growing and developing in other ways. Use them. Taken as a challenge, waiting to get pregnant can be a chance to dive into one another more deeply and become stronger as a couple.

Holidays and parties can sometimes become a minefield. I wish I had known that before trying to get pregnant. I'm sure it would have saved me a lot of stress.

Believe me, while waiting to get pregnant, you are suffering enough and really don't need to say yes to everything. So be selective about accepting invitations to family gatherings or any parties with a lot of children, especially the newborn ones. Simply, say no. No, you are not in town. No, you have plans you made a long time ago. No, you must help a friend who is sick, separated, dying, whatever.

Together with your partner, focus energy on other projects and things which you both find exciting (and will not have time to do once you become parents). This is actually the best way of coping with waiting, but suited well only to couples who are young and have time.

Practice how to answer difficult questions with your partner. The thing is, no matter how well you hide yourself in everyday routines, someone will appear who has nothing better to do than stab mental knives in your open wounds. Both

you and your partner should have answers to standard insensitive questions ready so your life does not have to suffer.

For couples who have been trying to conceive for a long time, it is helpful for them to learn as much as possible about why they can't get pregnant. It helps to gain some control and motivates them to act to increase their chances of getting pregnant.

I found out that one good source of distraction for couples, and even more for the woman, is helping people in need. Or animals! Simply doing, caring, and giving your best to victims of some sort. For me it felt very good to get in touch with other women who were waiting to get pregnant. I could not get enough of that. All the lucky, happy, successful people I knew before just did not interest me and did not inspire me anymore. I discovered one particular Internet forum where I could be my best self—as it was there that I was helping many clueless women understand their medical reports and laboratory findings. I was amazed to find out how many women suffer in silence, how many didn't even have the basic knowledge of their own body, or how difficult it is to live in the places where commodities of medical care are not self-evident like they are for most women who are reading this book.

In this, I was forgetting my own troubles to the point that they did not feel relevant anymore.

### **When communication fails: Don't let the men waste your time**

I can't count how many times I've had conversations with women in their thirties who told me that they would not mind a pause in their careers, but their partners did not want commitment in the form of children. Even more absurdly, some say they never even discussed that sensitive topic or felt they would lose some of their dignity or even power in the relationship if they brought the matter up.

Typically, women I talk to are academics, or young professionals without children from previous relationships; that is, women in situations where, if that particular guy does not change his mind in the next few years or so, then they could easily find themselves missing the opportunity to become mothers. When this actually happens (and it happens all the time), I am again surprised how many women downplay their emotions, pretend the motherhood issue never mattered to them in the first place, or simply pile themselves up with work. Needless to say, they don't talk much about it. In that way, this common and painful injustice to women who have so much to give and would make excellent mothers remains largely ignored.

If you now wonder why I suddenly have this hard attitude towards romance, I suggest you pay attention to the way that most men talk in Internet forums or any other places where they can openly express their opinion on dating women aged thirty-five and above.

The reality is, the vast majority of women who have not had children by that age, will want to have them soon. This leads to power shifts and different ways of compromising in relationships and on the job. I hope that you realize, I'm not pretending that I'm writing a book about gender equality. Men and women *are* very different. These differences start with genes, turn into hormones and brain connections, and end with different behaviors and needs.

One interesting question is, why is it that women stay with men who don't want to become fathers? Or, would it be better to ask, if a man is dating a woman in her thirties, maybe even lives with her and knows he does not want to be a father, why is he wasting her time? What is it that he wants from her?

If it's her looks, then he can date women in their twenties who possibly can have more to offer in this regard.

If it's her intellect, then women beyond menopause should be his target, as their skills are coupled with valuable life experiences and interesting stories they can

tell.

Why are so many unmarried women in their thirties anxious about starting a conversation with their partner regarding parenthood and asking what he has to offer in this regard? Why are they reluctant to leave the one that clearly does not qualify?

The sad thing is that when a long-term relationship falls apart, men can always move on and some day build a family with a young woman. But do you have a fall-back option for yourself?

If yes, then everything is all right. If not, then don't let him waste your time.

## **Talk to other women who are trying to get pregnant**

Countless women are going through the process of waiting to get pregnant alone. Typically, the longer a woman tries to conceive a baby, the more she will analyze and agonize about it. In the worst case, she can become so sensitized towards that issue to the point that she isolates and retracts herself from people who once were most important to her.

Don't let this happen to you. Communicating and being able to talk about what frightens you while you are waiting to get pregnant is absolutely essential. In addition, it's pleasant and will help you ease this sometimes devastatingly long process of waiting to become pregnant. Many women tend to isolate themselves and feel discouraged after they fail several times to achieve or keep pregnancy. As a result of the enormous psychological pressure, all kinds of anxieties, depression, or partnership issues can arise in this phase.

Especially for women who used to be high achievers, not succeeding in getting pregnant can push them to the limits faster. But once you are aware of all that, you can undertake everything possible to not let it! Before consuming too much green tea and diving into courses that teach you how to relax, why not get

together with other women who are also waiting? By talking and sharing hopes and fears, it could bring you another perspective and relieve half of the emotional stress you are feeling.

Regular exchanges with other women who have similar issues can work magic and gives you the feeling that you are not alone.

In many cultures, waiting to get pregnant is treated in a secretive manner, and it's generally hard to meet women who will openly talk about it. Now, if you are lucky to live in a big city, you can join groups that meet regularly to talk and support each other, or at least join an online community. With such a group, you can practice relaxation techniques or exercise together, eat out, or simply be there for each other to talk about any stressful experience that may occur along the way.

## **For those in fertility treatments: Communication with medical professionals can be a challenge**

One doctor may be great in designing the right IVF and ICSI protocols, but is he or she at the same time a skilled embryologist with enough time to spend on the microscope analyzing your freshly retrieved oocytes?

In the same way, a great obstetrician might not be aware of issues hidden behind subtle endocrinological imbalances. Human fertility is a complex issue, and no doctor should be expected to master or even be aware of all its facets. In addition, research in this field is making fast progress, so if doctors don't find time to keep up-to-date and visit major conferences regularly, soon there is a gap created between what science knows and what fertility clinics practice. Many women believe they can't do anything about that. Not true.

To start with, you can learn about your own physiology to the best of your capabilities.

At first, this may require some learning. You are anyway impatient while waiting to get pregnant, so the best thing to do is to channel this energy towards understanding your body better. There is no way around it; you must learn in order to help both your doctor and yourself improve and reach better results, until you hold your baby in your arms.

It is a lot about being a good communicator, and with each visit to the clinic you will get better. Asking your doctors lots of questions may take some courage at the beginning, and sometimes even make you feel like a total fool. But, when it comes to becoming a parent at an advanced age, nothing else will save you more time than being able to take an active role, instead of being just another object processed in a numerous string of patients.

Remember, under the authority mask they are obliged to wear, doctors are just as overworked and tired as the rest of us. Luckily, they are interested in achieving the same goal as you: getting you pregnant. Therefore, if you have a well-minded, straightforward attitude and know what you are talking about, the right doctor will catch on and actually appreciate the help and input coming from your side.



# Fun for your eggs: Baby-making should be HOT

Our lifestyle has changed a lot over the last several hundred years. While this seems long when measured by a lifetime of an individual, it is actually just a short moment in time, a far end of the continuum in which we have spent 99% of our existence on Earth.

How lifestyle changes impact our fertility, we don't know yet, and we don't have a system to make comparisons and find out. However, there are good reasons to believe that modern living negatively affects women's fertility by a mixture of factors:

- ~ A way-too-delayed pregnancy timing (it has become socially acceptable and sometimes desirable to delay getting pregnant until after thirty-five).
- ~ Suboptimal nutrition: processed food, diets based on high sugars, low nutrient-density foods, and constant exposure to environmental toxins.
- ~ Indoor lifestyle and low physical activity in most women of reproductive age.

But how did humans reproduce during the Stone Age? What did they do differently? How long did it take our grandmothers to get pregnant? Was sex during 99% of our evolution similar to what most couples who are trying to conceive practice today?

There are many things about the Stone Age that we don't know, but that our ancestors did have sex that eventually led to you and me, we know for sure.

In spite of the importance of the topic, only a few systematic studies exist on the regular sexual behavior in the Stone Age, and these are mostly based on research of the few remaining tribes of hunter-gatherers who live in central Africa.

Recently, I came across one detailed report (Hewlett&Hewlett 2010) that I found very informative. Here is a short summary:

Several parameters such as reasons for having sex, frequency of sex per night, and sexual beliefs and practices were examined in the adults from tribes which are called the Aká and Ngandu. These are well-known models of folks who have lifestyles that closely resemble the way humans lived throughout the most of our evolutionary past. Yet, there are big differences among them as one tribe represents typical hunter-gatherers while the others are farming folk.

Interviews conducted with married adults aged eighteen to forty-five revealed that, on average, people of both tribes had sex at least two times per week, often with more than one orgasm per night. At first I thought I misunderstood something. *Why would people who have such hard lives want to get so little rest in the night?*

At the same time I was wondering, what is the number of weeks in my life I have spent in that rhythm. One? None?

One way or another, men of both tribes climaxed on average about two times per night on the nights they had sex, which was followed by two to three nights without any sexual activity. This corresponds well with the time needed for sperm to first disperse and then regenerate.

I was amazed. Without any theoretical knowledge behind making babies, these people did things in a way that was perfectly suited to their physiology.

Age did not have much impact on the frequency of sex (but here one must consider the age span represented in the interview and that both folks marry early).

What fascinated me most was that when asked about the reasons for having sex, it was the *men* in both tribes who emphasized their desire for children.

Sex was generally seen as a pleasurable activity, but also as an activity that

required a certain amount of effort. Actually, sexual intercourse was compared to searching for food during the day, only easier, less dangerous, and with the advantage that one could take naps in-between. One of the words men used for sex was “finding children”, and when asked more about the reasons for having intercourse with their wives, they invariably stressed the importance of becoming fathers.

So is there anything there for us to take home?

Maybe an important insight on how best it might be to have a dynamic sexual life, physiologically meaningful spacing between intercourses and not much knowing or planning. A capability to have spontaneous sex as opposed to analyzing and agonizing about it seems to have been the strongest advantage for people living in the Stone Age.

If you are a woman who has been trying for a long time to get pregnant, maybe you can remember that the next time you face the following situation:

After days of hoping, waiting (and sometimes peeing on the test strips in other people’s toilets), your ovulation test finally shows that famous second line? Ovulation countdown is over—great! But now you have only about twenty-four hours to make your next intercourse happen—that’s not always so great!

What if your husband is not at home?

Or not in the mood?

If you end up having an argument with him on the day when you are ovulating?

How cool is that for the relationship which was so different before the baby project?

What can you do?

You can remember your ancestors for a moment and trust their wisdom that baby making should be HOT, and not thinking and not caring to know is the best

strategy to have.

Think of all your distant grandmothers. Imagine your mother holding your hand, and her mom holding hers and so on, until the unbroken line of several thousand women creates a line of your descent. All these women are directly related to you, and if only one of them had not been pretty, healthy, or just lucky enough to meet the right partner at the right time and have at least one child with him, you would not have happened. You are one of them. Try to visualize them. Feel they are holding your hand and want you to succeed. As hard as it may seem when your mind is overrun by information noise, there really is no other way to hot baby-making sex but to relax and disconnect from your own racing mind for a moment.

Forget the lab coat and put on sexy underwear.

Children are out there, and you just have to continue searching for them.

## **The role of the female orgasm?**

Some women are extremely tough cases. The longer they wait to get pregnant, the more stress and agony builds up around the time of ovulation. Sound familiar?

In such cases, here's an academic task you can try to solve each time you find yourself having that we-should-have-sex-today anxiety.

I am serious—instead of troubling your husband with your exalted feelings, dive into your own mind and make yourself useful by helping to find a solution to one serious scientific issue. There is one thing the whole world is desperately trying to understand. You will not be surprised to hear what it is:

The role of a woman's orgasm is still not well understood.

So you can make it a personal challenge to help scientific progress on this issue. Here are some of the hypotheses you can start with:

- ~ Having an orgasm helps sperm find its way upwards better.
- ~ Orgasm increases the bonding of a woman to a man with whom she experiences orgasm.
- ~ Orgasm increases a woman's chances of conceiving.
- ~ It is more likely for a female to experience an orgasm when mating with males with superior genes.

Which one would be your pick?

Or do you feel that more research needs to be done?

Some alternative thoughts I found in an incredibly cool and insightful book on motherhood written by an anthropologist, Dr. Sarah Blaffer Hrdy ("Mothers and Others" - the kind of book that makes it worthwhile to get pregnant and move to the next level of reading about babies). In this work, the author plays with the idea that the female orgasm may be "a once adaptive retention no longer selected for", like some reflexes which once had their function for survival but no longer exist. You know how babies grasp with their little hands while on mom's breast? In their twisted genetic reality, they are actually trying to attach and secure themselves to their mother by grasping for her fur, which no longer exists. This would mean that the female orgasm might even fade out in future generations. Another interesting perspective?

Or maybe you prefer to focus on the role of cultural differences in how the orgasm should look and sound like? Is it ultimately useful? So much to solve before the final vote, so helping to solve this issue will hopefully make your time while waiting to get pregnant more enjoyable.

# Who to believe?

“Getting pregnant after thirty-five is not a problem.” “Older women have a hard time getting pregnant.” “It is not possible to improve the quality of a woman’s eggs.” “Adaptations of your nutrition and lifestyle improve egg quality, as well as general health.” “You should have sex often.” “You should give sperm time to regenerate.” “You should take action.” “Don’t try so hard. Relax! It’s all in your head!”

It all depends on who you listen to.

Any woman who is impatiently waiting to get pregnant will find that there is a lot of information available on this topic, but how do you cut through the informational jungle? But who to believe and how to understand what is important for YOU to get pregnant?

There are plenty of great resources available on the web, but which review medical evidence reliably, and which are better-suited for other purposes?

## Internet communities and forums

Internet forums are great for chatting and helping you feel that you are not alone. Many women feel guilty for isolating themselves, or even spending their working hours on fertility forums. But those who are trying to get pregnant for the first time are especially impatient; their minds are exploding with questions.

There is one kind of thread which always runs the same way, in which women simply gather and count down together: days left before the pregnancy test, before ovulation, before whatever is the next move in the battle to get pregnant.

This always reminds me of a scene from the African desert, when all the wild

animals peacefully sit around the only pond of water left. Without much action or superfluous movements, they wait for rain which will change the direction of their lives. Only, instead of rain, women wait for a positive pregnancy test, and it is exciting to be around when they announce it, often before their family or even partners know about it. Chatting in forums and joining communities relieves a lot of anxiety, plus it's a fantastic source of comfort and help in surviving the two-week waiting time.

## **Fertility research progresses rapidly: How to find and read academic papers**

However, if you're not expecting anything more than a quick hug or moral support from forums and random Internet searches then you might be left a little frustrated, and might even end up pushing some real fear and anxiety buttons. Humans are individuals and unexpected things sometimes happen, meaning that there is pretty much no horror experience or twisted opinion which one can't find on the Internet. If you want in-depth knowledge, stick with university pages, top-rated books, sources published by the major clinics (like the Mayo Clinic), and scientific publications. What do I mean by scientific publications?

Well, this method of research may be more time consuming but I recommend it for women with fertility issues, those who are searching for information on particular conditions, IVF protocols, or treatment options.

Reading scientific journals is easier than you think. There is a great online database with several thousand journals from subject fields such as medicine, biology, psychology, etc. It is called *Medline* and since 1997 has been free to access.

Finding the database is very simple: Go to Google and enter the following words: *PubMed*, *Entrez*, *NCBI*. I know, these three words sound weird, which is possibly the only reason why people don't know and don't use them.

So there you are, taken into the heart of scientific knowledge.

Once you get inside this holy grail of information, everything else is self-explanatory. Search according to the keyword or a medical condition that bothers you. Enjoy reading and learning. The good thing is, summaries of all publications are FREE, and should you need the full text, it can typically be bought for about \$20.

Another good thing is that just beneath the title of each publication, you can see the names of the authors, as well as their affiliations and contact addresses. Should you have a specific question, don't hesitate to ask the person who did the work! Don't wait for magazines and TV to tell you how things are; ask those who know best. Very often, researchers are lonely wolves, trapped in their laboratories during long working hours, and when they publish results, these are often only appreciated by the handful of colleagues scattered around the world who happen to work on the same subject.

You will be positively surprised how many scientists are happy to receive feedback and give more information about what you want to know.

But be careful when you enter this world not to overinterpret the information you find. One would think that research can't lie, but that's not the case. Whether you try to understand a scientific paper yourself, or you come across articles where publications cite medical evidence, keep in mind that we live in a time when just about everything eventually gets to be published in one sort of scientific journal or another.

With the tremendous pressure put on the research folks to publish, the quality of the outcomes might get compromised. For example, in the biomedical field, there exist a few thousand journals. However, the majority of them have a low impact factor and only modest quality requirements for the article entry.

As a matter of fact, only a handful of biomedical journals contain the kind of data that is a true contribution to the science and will have a relevant impact on



the field in the future. Even for experts in the field, it is sometimes hard not to get lost. But you are safe if you look for whether a certain topic you are interested in (plant extract? treatment? branded multivitamin?) was studied by many researchers and independently confirmed at institutions around the world, or if a notice of it occurred only on a few occasions and then disappeared.

Noise is all around, and top research is not free of it.

Knowledge which is based on archeological records and natural laws is reliable, and for that reason I spend much of my time researching and trying to understand women's lives and fertility by looking at the time from the Stone Age until about ten thousand years ago.

Pay attention to any double-blind, randomized, and placebo controlled clinical studies involving many participants, ideally from several institutions and countries. It would now go far beyond the scope of this book to discuss quality standards in medical research, but if you keep your eyes wide open and always search for the best quality information, you are on the safe side. Nobody is in possession of the Holy Grail of truth. Be open to all possibilities.

Depending on your previous education, all this may require some initial effort. But if you enter the adventure of getting to know all about the intricacies of fertility, it will likely become the most relevant and rewarding enterprise that you can do for yourself and your future family.

# **It takes two to baby**

Although this book focuses primarily on female fertility and ways to improve it, I wish to mention a couple of issues that are related to men. It takes two to baby, so before searching for more possibilities to put all the responsibility on yourself, keep in mind that over one-third of fertility issues are related to sperm quality.

As discussed in a previous chapter, countless women are going through the process of waiting to get pregnant alone. Not only do they put friends and family outside their cloud of worries, but also often the partner, with whom they are actually trying to get pregnant, is not involved.

A friend of mine was an extreme case; from month to month she pumped her abdomen with hormones in preparation for the IUI (intrauterine insemination). She feared needles, had several minor side effects, in addition to putting up with all the organizational issues surrounding a fertility treatment. Yet, the most difficult part of the whole process for her was making sure her husband would deliver sperm on the day the retrieval of her eggs was scheduled in the hospital!

Like most other men, her husband did not like the idea of his sperm being analyzed and counted. Each time he had to visit the small room and watch soft porn in there, while everybody around knew why he was there, it was deeply embarrassing for him. He felt that his whole personality was being reduced to performance and their relationship was suffering after every such episode.

If some of that sounds familiar to you, it only means that you and your partner are no exception to the rule.

## **Talking about sperm testing**

You realize you don't have to be like my friend, don't you? Waiting to get pregnant is hard to go through alone, so first, you want to look for women who are in a situation similar to yours. Look for new modes of communication with people around you, and this includes finding new ways to communicate with your partner, too.

If you are suffering in silence and always letting him enjoy the fun part, while you take the entire load of waiting to get pregnant anxiety upon yourself, it may be time for a new conversation.

Without saying that you need to bother your partner with every unnecessary detail related to your ovulation, and take all romance and spontaneity out of your sex life, keep in mind that you are still together in this process. This means that there's a little more information about your partner that you both need to be aware of.

He will understand.

Especially when you explain to him that sperm testing is not so much about him, but about you. About you who worry night and day, about you who want to be mother of his child, about you as a couple who are ready to move to the next dimension and become one person more.

## **Testing in the clinic**

If you are over thirty-five and have been trying to get pregnant for over six months, it is best to make a visit to a doctor together. You still have the privilege of feeling innocently relaxed and can take this tour as a short and funny visit to another planet. Nothing special will happen there anyway; you will be asked silly questions and realize that many more couples sit in the waiting room for the same reason. Your partner may even get to watch some soft porn to help him leave a sperm sample, and then you will go home. How complicated is that?

There is really not much more than that going on in the fertility clinic for men. When it comes to checking sperm, there really is no need to agonize and have exhausting, long discussions over the issue.

This is what a quick and cheap laboratory test will let you know: sperm count (total and number per milliliter), vitality (how many are alive), motility (there are subcategories to this), and many other fine details. Results will most likely be summarized in a few sentences on the laboratory sheet; if not, you will need to ask one of the qualified people in the clinic to help you understand it.

It is important that you don't jump to conclusions and don't interpret numbers yourself! Why not? Just like eggs, sperm live in their own funny world, which is quite different from ours, and certain numbers or behaviors don't make sense for us.

If the results of the semen check are good, this can relieve a lot of tension. If not, it will save you time by letting you know that there may be some more waiting on the horizon.

What about sperm values that are somewhere in between? Not entirely negative, but not optimal to making you pregnant either?

Such situations are called "mild sperm issues" and it is actually very common nowadays. In itself, it is not a big problem, but for women over thirty-five or otherwise impatient, it can be a serious issue, and for that reason, I want to say a few words about it.

First, if your partner has a mild sperm issue, you will need the help of a specialist to find out more about what it means in your particular case. There will probably be some waiting or some luck involved to get you pregnant, both of which you can't control, which can also create tension.

Generally, it is possible for men with mild sperm issues to father children, and vice versa. This alone is not the deciding factor on the fertility of men. The only

true measure of sperm's fertility is its ability to cause pregnancy. There is a whole lot of magic and mystery related to the moment of conception, and that is good. If we knew more, maybe we would destroy its divinity.

For women who don't have much time to get pregnant, mild sperm issues can be tricky to deal with. The reason is that their partners can make them pregnant, but there is more waiting, timing, and luck involved. This happens at the same time that your eggs are disappearing, declining in quality, and at some point you may see your own fertility fade away. Depending on how long you have been trying already, this may have a negative impact on your relationship.

Therefore a mild sperm issue will affect women of different ages differently—*your eggs are always a limiting factor*, and you need to fit your possibilities around them. Love them, feed them, and care for them, which is why this book was written.

## **Testing at home**

Maybe you've heard of the possibility of testing sperm at home? In the privacy of your own bedroom, avoiding any possible inconvenience and embarrassment?

Even if I recommend that you and your partner go and visit a specialist, I do see some advantages of home sperm tests. Home tests are especially good for women who only need a rough estimate of the sperm count, a green light for their partner's sperm, so to speak, or for women who are not in a long-term relationship and might feel uncomfortable talking to their partner about having his sperm tested at this early stage.

Testing sperm in a home-test is as easy as testing for pregnancy or ovulation. I can well imagine that soon it will cost less than \$30-40, and that new generations of women will become comfortable with using it.

To check the sperm count, a drop of semen needs to be mixed in a solution, and

then a few drops of this mixture placed onto a test strip.

Easy, right? I think this kind of test makes a perfect exercise in a biology course.

In just a few minutes, the result window displays whether the sperm count is on the acceptable level. The sperm count is considered low when below twenty million per milliliter. Everything above that is well-suited for baby making, in theory at least.

Here is a short summary of what you should know if you decide to do a sperm check at home.

Home-run sperm tests just give an estimate of the sperm count, but *not the actual fertility of a man*. Even tests done in the clinic need to be repeated at least once, and the best thing to do is put a two to three months of spacing in-between. The reason for this is that sperm values often oscillate, and only repeated testing can uncover any mild underlying infertility issues.

The good news is, whatever the numbers are (as long as there is live sperm in the ejaculate), there is no need to be anxious. Even if your partner has serious sperm issues, as long as there are live sperm in the ejaculate, this will most likely suffice to fertilize all the eggs you have left. Likely you and your partner will need medical help in this, but your chances to become parents are generally good. It is eggs that are the single most limiting factor, which is why I focus so much on them in this book. Summarized, even when sperm issues account for up to one-half of all fertility issues, they are among the easier ones to circumvent.

# Is it possible to improve egg quality? The end of one dogma

The following conversation happened five years ago, during the time I was trying to get pregnant with my first child. I entered the doctor's office, hoping to discuss possibilities on how the clinic could help me get pregnant. Still shocked by the news of my low ovarian reserve, prior to this meeting I had searched for scientific evidence on how to improve egg quality and found many studies that clearly proved benefits of prolonged CoQ10 and DHEA supplementation in cases similar to mine. Assuming that my doctor would know all about it, I asked her about details related to dosage and protocols. To my surprise, she leaned back in her chair, clearly surprised and said:

“I don't *believe* in DHEA.”

Just like that.

She did not say she would not like a particular scientific report on DHEA. She did not say she disagreed with one experimental method or the other. She did not say that her patients were not responding or having side effects.

She simply turned her head on the rock-solid evidence.

Coming from the world of science, where words like “I believe” are never a first choice to use, I didn't know how to react. How could it happen that there existed proven supplementation methods beneficial to women like me, and the one person who was supposed to help me did not know about it?

Unfortunately, I did not have the publications in the bag with me. By the time my next appointment rolled around, I had decided to change the doctor.

Maybe you, too, have a doctor who is not aware of the last decade's progress in

fertility research? Who is not aware that DHEA, CoQ10, the Mediterranean diet, and several more factors benefit the quality of a woman's eggs and make getting pregnant easier? Is it not scary and beautiful at the same time, how much trust we put in other people that they know all it takes to solve our problems?

## **The landscape of our understanding has changed**

Over the last years, things have changed, and public awareness around issues like biological clocks, reproductive technologies, and infertility in general has risen tremendously.

There is hardly any aspect of reproductive medicine that has not found its way into mainstream magazines. Be it infertility testing for couples, sperm and egg donations, embryo adoptions, or widely detailed emotional issues reported from over 1000 infertility blogs (July 2015 update), the new insights are here to stay.

Naturally, the presentation of infertility topics to a general audience remains on the phenomenological level, without cumbersome scientific data behind it.

Therefore, it is understandable if women don't know the details of why to give CoQ10 and DHEA priority over herbal treatments and teas, if they wish to get pregnant with their own eggs.

This may change in the future, and I have learned lately that clinics on the cutting edge of reproductive science are introducing programs that empower women to maximize their own fertility (ultimately, both IVF success rates and natural conceptions profit from good-quality eggs).

Still, there are many doctors who propagate the dogma "It is not possible to improve the quality of women's eggs." They easily mix "It is not possible" with "I'm not aware of" and will criticize scientific evidence without even bothering to read it, let alone look up the references within.

*In my opinion, there is nothing to be done about that.*



Time will bring changes, and that is how almost every scientific progress enters our daily lives.

There are always people who believe in one idea for too long to leave it and adopt something new. Those who were neutral or open from the beginning will be more likely to implement the results of scientific progress in their daily praxis.

Like the doctor I mentioned at the beginning. She now owns her own private practice and is very open to DHEA, as well as several other complementary treatments for egg improvement. How do I know? Because I like her and, after my children were born, she continued to be my gynecologist.

## **What's new in fertility research: A new IVF method launched in 2015**

If I had any extra savings, I would consider buying shares of OvaScience. Who is OvaScience?

It's the company that recently delivered a new, elegant, truly revolutionary IVF method and is the brightest star in the heaven of the IVF industry right now as I am updating the book in July 2015.

Maybe you've heard in the news about the new treatment that helps ladies rejuvenate their eggs and get pregnant with them, instead of going for egg donation?

The new IVF is some sort of egg-Botox, so to say. It is called AUGMENT, and it works well for ladies who have had issues with egg quality, or even a history of failed IVF treatments.

AUGMENT is developed to improve egg quality through a simple process of mitochondrial energy transfer. This means the treatment takes place between egg retrieval and egg fertilization - eggs are simply injected with mitochondria,

refreshed with energy-producing particles coming from the woman's own egg precursor cells.

But where do the egg precursors come from?

From the ovarian lining, a part of which is taken out during the egg retrieval (just a small piece, like in any biopsy). So this extra piece of ovarian tissue is used to obtain and concentrate energy-particles, which are then injected into the egg, which in turn, become stronger and more capable of producing viable embryos and healthy babies.

The target market for AUGMENT is all women whose eggs lack energy (in terms of biology, it translates to mitochondria being damaged due to age or disease). With the mean age of women starting the IVF process being thirty-six years old, AUGMENT would apply to at least 45% of the current IVF market. That's huge, right?

So far, 150 women have been enrolled in experimental trials at four sites worldwide (the company itself is U.S.-based). These include the Toronto Center for Advanced Reproductive Technology (TCART) and clinics in London, Istanbul, and Dubai. The first baby conceived by using AUGMENT was born healthy in April 2015, and before the end of 2015, approximately 1,000 more infertile couples should receive the treatment (worldwide, but not in the U.S.)

My homeland, Germany, is not on the cutting edge of reproductive medicine either. Here, we love to be on top when it comes to manufacturing cars (though this year we were disappointed by an emissions scandal in Volkswagen's diesel cars). And when it comes to eggs and reproductive technologies, the approach which Germany prefers to take is, first wait to see what everyone else does. Or how else could I explain that even a simple egg donation, not even to mention gestational carriers and egg rejuvenation using one's own mitochondria, are all still illegal in Germany?

Back to the benefits of the new IVF method. Because mitochondria from egg

precursor cells are the same as those in mature eggs, the procedure does not add any foreign DNA to the genome. This means, the entire material used for the IVF--eggs, precursor cells, mitochondria--everything belongs to the same woman. This circumvents a ton of complicated ethical issues (such as those raised in “three-parent baby” debate, where mitochondria become substituted with ones coming from a healthy donor).

This simple fact already makes AUGMENT easy to implement in both practical and theoretical terms, and I am confident that the new IVF approach will help many couples with a difficult history of infertility become genetic parents.

It is a true biological inequality that women are born with a set number of eggs, and that once they're gone, fertility ends. But if the new technique proves successful, egg precursor cells could slow the ticking of the biological clock — potentially allowing many women who are tough cases and struggle with infertility to get pregnant and give birth to their own biological child.

# What women don't know and doctors don't tell

Maybe this book is making you wonder, if simple changes in managing lifestyle habits increase the chances of getting pregnant, why is it that fertility specialists all over the world don't tell women more about it?

But let me put it another way: Why should they?

Take my example: My husband and I went through a series of unsuccessful fertility treatments in one of the best clinics in Germany. This translates as high costs, which were covered by our insurance. But to us this didn't matter; we were ready to do whatever was needed and invest even more in order to become parents. Much more.

Then at some point, we succeeded in getting pregnant naturally. My pregnancy was confirmed by ultrasound at our fertility clinic. Doctors congratulated us, and we never saw them again.

Are you getting the picture?

Now, am I saying that the medical specialists are deceitful people who don't want you to succeed in getting pregnant naturally? Certainly not. In fact, all the people I know who have studied medicine have good, caring, and altruistic personalities. Unfortunately, their working hours are often brutal and, if they run their own practice, often accompanied by huge amounts of administrative work.

So when should these overworked folks find time to attend conferences and read scientific journals, to teach you how to improve your chances to get pregnant naturally? In the evening, when they go to their own families? On the weekend, when many continue working to meet ovulations and the priorities of their

patients? I actually understand them so well that my husband often jokes and tells me I should write a book to let the world know how difficult the lives of medical doctors (and scientific postdocs!) are when they try to help others, keep up with and conduct research, and teach, all in one career.

In a nutshell, you and the medical doctors at your fertility clinic have the same goal: to get you pregnant. But the moment you get pregnant naturally, you are not your clinic's business any more. Again, this is not to say that fertility specialists don't want you to succeed in this way, they simply have different priorities. *Your nutrition, supplements, or management of your life habits are not one of them.*

For example, doctors often put a lot of faith in high-tech solutions at their clinics, and with good reason. The pregnancy rates at many clinics are better than natural rates, even in young women. That's definitely something to feel proud of, and it only became possible a few decades ago.

Taking advantage of all *other* options that will boost your chances to get pregnant is entirely your responsibility.

It would be great if, at some point, information on ways to improve fertility become more broadly available to women when they are still young. However, for the moment, we still don't live in that world.

Therefore, women in fertility treatments need to acknowledge that there are vested interests and other priorities on all sides of the process, but luckily these are not unmanageable. On the windy road to motherhood, sometimes there can be some miscommunication or even silence going on. But don't become discouraged; all these are steps leading you in the direction that is right, and that's what matters most.

Put a hat on for a rainy day, and be prepared to sometimes feel a bit lonely during the journey.

## **Power goes back to women: The ultimate fertility treatment is lifestyle intervention**

The new twist from recent fertility research suggests a shift of power from technologies back to women.

For several decades now, reproductive technologies keep amazing us - in vitro fertilization, pre-implantation diagnostics, and modern culture conditions have all managed to result in implantation and birth rates that are higher than those in natural cycles. However, certain components of success for “love in the Petri dish” seem to be coming to saturation. High pregnancy rates, even at the best fertility clinics, are flattening off, and this is not likely to get much better in the future. Live births might not improve drastically in the future due to improvements in technology.

*Power goes back to women.*

Technology has brought us as far as it goes. However, to make the best use of technology, women who wish to get pregnant at an older age should take the initiative and face their own peri-conception challenges.

Peri-what challenges?

It is the time window in which your eggs live just before they become fertilized, and in the last years it's become clear how overwhelmingly important this window is for the whole pregnancy to develop well.

In short, what you do and how you live before you become pregnant will affect many factors: your egg and embryo quality, hospitality of your uterus, and the likelihood of implantation – the earliest relationship between you and your baby. Combined, these factors will determine whether a pregnancy will end up in the birth of a baby.

Scientists nowadays agree that, when it comes to making babies, the best return-

on-investment comes early in life.

At the very beginning, it is the *quality of your egg* that determines whether life will spark from the meeting of two cells. Next, it will be the *hospitality of your uterus* that enables the embryo to be accepted and nurtured by its mom during the next nine months, and the *first several weeks* of pregnancy will continue to be critical for the development of all major organ systems.

Not every woman is able to achieve the best conditions to get pregnant in the same way. In spite of their general similarity, lifestyle interventions must be individually tuned.

This means that recommending folic acid, or reminding women how under-nutrition leads to infertility, or how being overweight, smoking, alcohol, and drugs lead to subfertility, belongs to past decades.

Nowadays, we have the knowledge and the tools that enable us to better differentiate these issues. This is especially true for women who are facing infertility or are moving toward the end of their reproductive age.

That, of course, requires some effort, and the downside is that the responsibility balance shifts back to you. However, the rewards are greater, too – by taking control and managing your life habits, you can maximize your chances for motherhood, be it in the natural way or with the help of technologies.

## **We can't ignore the environment in which conception takes place**

In the long run, caring about parts of the body that will help you to grow a baby once you are ready is not too different from nurturing and maintaining the rest.

Do you use the same cosmetic products in your twenties, thirties, or fifties?

No.

Was it difficult to learn why? No. You've learned it from a young age and adapted your make-up accordingly.

Along the same lines, why would we expect the same diet to supply an optimal environment for the conception for a twenty-, thirty- or forty-year-old woman?

Or the same nutritional supplements, particularly those known to be massively missing in many Western diets (like some B-vitamins), or are deteriorating in the body with age (like DHEA and CoQ10)?

In terms of increasing natural fertility, lifestyle management is much more important; in contrast to cosmetics, which are made to cover over or, at best, to give instant relief, lifestyle interventions introduce profound and lasting changes to all levels of metabolism and help relieve a big amount of stress by slowing down your biological clock.

Decades ago, when branches of science, such as reproductive medicine, population genetics, and biostatistics didn't exist, it was easy to say, "My mother smoked and I turned out healthy," or "Nothing can influence the quality of women's eggs."

Now, the results of research are there, the landscape of our understanding of circumstances in which conception takes place has changed, and I am privileged by the opportunity to forward them, especially to women who work outside the medical or scientific research professions.

Finally, we can't continue to be blind to the environment in which we conceive. And it is YOU who decides on that environment. Make it a good one – the body will do the rest of the work itself!

*To summarize: Peri-conception and pre-implantation are the most critical times for the future health of your baby. Decisions that you make and the way you manage your lifestyle habits before you get pregnant are the best health investment you can make. Don't miss it.*



# Now that you know what helps improve fertility, what's next?

Now you know how women over thirty-five can improve their chances of conception. Hopefully, this book has been interesting enough to keep you engaged and has presented enough scientific evidence to convince you that a few improvements to your life habits are a worthy investment.

As often mentioned, at the end you will find references and leads that you can follow for further information. They are pure gold and contain a lot of in-depth information on all topics discussed in this book.

So what happens next?

I see two steps: 1) you need to make a conscious decision that you will do your best to change your lifestyle and improve your chances to get pregnant; and, 2) follow the suggestions as outlined in this book and allow three to six months for optimal results (or print out the last page - “Last Train Recipe” - as a reminder to stick on the fridge or another visible place).

While in the process of maximizing your fertility, please don't forget to have fun! I am convinced there is no need to be a perfectionist or to be too hard on yourself, and that having to wait to get pregnant is hard enough. Simply integrate as many points as you can into your daily life (I personally function a lot according to Parreto's principle of 80:20, meaning that executing 80% of just about anything will be sufficient to demonstrate a result) and *give yourself about half a year* to allow for any obvious consequences.

But how sure is it that you will see any?

Even when you adjust your life habits to maximize egg quality and your overall

fitness, can anyone guarantee you to get pregnant?

I am sorry to say, no.

But let me also add this: Could anyone assure that a woman who is expecting a baby will get a child who will make her nothing but proud and happy all her life? Still, will she want less to become a mother? In the adventure of parenthood, everything is about taking risks, weighing risks and benefits, and going with the flow of life.

As a scientist, I can point out the evidence on women who succeeded in getting pregnant naturally at an advanced age as a consequence of adjusting their lifestyle habits.

As a woman, I can tell you that probably nothing will happen unless you take the initiative and grab your chance. For me, becoming a mother has been the most rewarding adventure in my whole life, even though the road was sometimes bumpy.

“Bumpy” is actually a mild way to describe it—it was the night of my first son's birth that I realized how big and underestimated the depth of emotional pain is for women who are waiting too long a time to get pregnant.

In the middle of rushes, I was riding contraction waves and thinking, *is that it?* Compared to everything I've been through to have this baby, this pain of giving birth is really bearable!

I send you hugs and hope you will agree with me very soon.

## **Thank you for reading.**

Has this book been useful to you? If yes, would you consider giving it a review on Amazon by simply [clicking here](#)? Alternatively, you can write to me (email available on my website [here](#)) and let me know your suggestions. I may not answer each individual email, but will make sure to integrate your questions in

the next revision of the book or address it directly on the website.

Thank you!

The last bonus chapter deals with egg freezing. If that is not your concern, you can skip and go directly to the Last Train Recipe.

# **BONUS CHAPTER**

## **Freezing eggs - useful information not easily found elsewhere**

Do you belong to the group of women who sometimes play with the thought of freezing their eggs? There are so many reasons which could naturally bring you to that idea: broken marriage, partners who don't want to have children just yet, great job offers, relocation...and so on.

But let's get one thing straight first. Freezing your eggs is nothing like freezing sperm. To freeze sperm, one guy enters a little room alone, watches soft porn and then goes home.

Freezing eggs is nothing like that.

Egg freezing can be compared to the invention of the contraceptive pill 50 years ago – both represent revolutions in terms of giving women a freedom in her reproductive decisions. The Pill separated sexual intercourse from actually getting pregnant, and gave millions of women the illusion that they can create a family later in life, whenever they decide to. Freezing eggs is supporting reproductive procrastination even further, towards age 40 and above. But wait, are you telling me I should not freeze mine?!

No, I am not telling you that. Only, before you decide what is right for you, there are a few things you should know:

The technology used to freeze and thaw a woman's eggs is very recent. Just a decade ago this was possible only in a handful of high-tech laboratories around

the world. So, there is still a lot to learn.

To date, doctors have frozen many eggs, so they kind of know that part works. But how things will turn out when women start converting those eggs to babies someday is still uncertain. As I write this (end of 2013), about 200 babies around the world have been born from frozen eggs, still too few to create any reliable statistics.

Basically, we still don't know anything about possible short- and long-term consequences on the physical and mental characteristics of children conceived this way. Egg freezing and thawing is an experiment that has just begun. So it's OK if you want to take part in it; however, don't put all your hopes for a future pregnancy in this basket.

But let's start at the beginning. There are good and not so good things about freezing eggs.

There's also one alternative.

I'll try to explain everything you need to know about both. Hopefully, that will help you get the picture.

## **Good things about egg freezing**

Freezing eggs is the only way to circumvent the biological clock and preserve some of a woman's fertility. In addition to enabling pregnancy with her own genetic child at an age when the woman's eggs might have been long-gone, egg freezing can relieve much of the anxiety when a woman in her younger years wishes to progress with her career without feeling constantly constrained by her reproductive biology.

In my opinion, there is no doubt that freezing eggs is a wise strategy for any *young* woman to take. As already mentioned, the process itself is not as simple as freezing sperm, and there are inconveniences for which one needs to be

prepared. But, if this is the only way to circumvent the biological clock, is it not a perfect example of where parents should help with financial and other support?

Would that not be more meaningful than investing in expensive birthday presents, cars, or exotic travels?

Smart parents should, in my opinion, invest in buying their daughters time, not liabilities. Now that the technology is available, far-sighted parents should take advantage of it. Just in case their daughters decide to pursue an education and career first, helping them to freeze their eggs while they are young will give them a chance to become mothers someday. Why not see it as a first, direct investment in their grandchildren?

To conclude, freezing eggs is like buying insurance; you invest in one fallback net and hope you will never use it. Only that it is better-as opposed to insurances invented for scenarios which will almost certainly not happen, losing one's eggs and the power of natural reproduction is a certainty in every woman's life.

Given that freezing eggs is still an expensive technology (the procedure itself with all the extras around it can easily add up to several thousand dollars), it might take time for new generations of women to accept the idea that investing in back-up solutions at a young age does bring important benefits some years later. In years that will come.

## **Downsides of egg freezing**

A friend of mine broke up with her boyfriend at the age of thirty-eight, after many years of being together. Brokenhearted and confused about the direction her life should take, she wished to freeze eggs before doing anything else.

Another friend said, neither she nor her husband felt ready for a family yet (until that point, they had spent close to twenty years together). So they came up with the idea to freeze her forty-year-old eggs and get a few more years before

making a long-term parenting commitment.

*Unfortunately, there are tricky things about freezing eggs for women of thirty-five and above.*

Imagine going to a farmers market on a hot summer day: do vegetables look the same at eight o'clock in the morning or when the market closes in the late afternoon?

Are you getting the picture?

There are differences in egg quality when women get older, so you should be prepared that you may need to freeze more eggs than a twenty-five-year-old woman. At the same time, it may take your ovaries more time to produce eggs you wish to freeze.

The older you are, the more precious your eggs become, until a point when freezing becomes just too much of a risk. That's why it's important to be aware of other options and alternatives; however, before discussing those, here's a short primer on the procedure itself.

## **What to expect when you decide to freeze eggs**

For those who are considering freezing their eggs, here is what you should expect:

First, you need to do some research and decide where you want to do this. Egg freezing (also called vitrification, oocyte cryopreservation, and social freezing) is a new technology and data related to pregnancies using frozen eggs are limited, so you want to work only with the best clinics.

Next, your doctor will need to test your ovarian reserve to get an idea of how your ovaries will respond to medication. Depending on the clinic, there will probably be HIV and a few other tests done before you get the green light to stimulate your ovaries with medications so they can produce eggs that will

eventually be frozen for future fertilization.

## **Answers to know before freezing eggs**

Before you freeze eggs, there are several questions you need to think about. I will start with the easier ones:

*How many eggs would you like to freeze?* Most fertility experts recommend freezing a total of twenty to thirty eggs. In theory, this range of number enables you to thaw six to eight eggs for each pregnancy attempt later on, and allows you to have eggs in the stock if some IVF attempts fail.

Egg retrieval can be hard-going. Are you really ready to go through it? Think that women over thirty-five may need many eggs to achieve a reasonable level of probability to someday get pregnant with them.

This can mean more cycles of ovarian stimulations. In each, you will be self-administering medication. This means injecting your belly fat with a fine needle in the days before the ovulation, which is not exactly fun. But it is not a tragedy either and just in case you decide to do it, there are excellent videos on YouTube that can help you. What women are injecting is simply a high dose of FSH, or its synthetic counterpart. You may recall the chapter about how older women's brains must scream to be heard by the ovaries to make them produce eggs. This is exactly what these medications are doing.

Next, comes the day of egg retrieval - a quick hospital procedure done under total anaesthesia, but usually you will be allowed home after just a few hours.

Do you have a backup plan? What will you do if your ovaries do not respond to stimulation, or the treatment cycle has to be cancelled for any reason? How important is pregnancy to you and how far are you willing to go? If you have a partner, is he okay with you on that?

After you solve all that, there are a few more issues you need to be aware of.



You will be surprised to hear what they are.

## **Why the REAL challenge of egg freezing is egg thawing**

Since eggs are frozen with the idea to someday get pregnant with them, I would like to address that issue from the perspective of your future child. For him or her, the challenges come with the thawing part.

As a cell biologist who has seen many kinds of cells thawing, I can tell you that this not fun to do for any cell, and for a woman's eggs, certainly not! Some cell types are more robust and survive thawing very well, but many become sleepy after thawing, behave differently, or even die!

Each time that my students and I did experiments with cells we actually tried to not freeze them at all, because after thawing they were often no longer giving us meaningful and reproducible data. And here I speak about short term treatments with vitamins and hormones, nothing fancy and miraculous like expecting thawed eggs to first become fertilized and then grow to become your son or daughter!

### **Thawing sperm versus thawing eggs**

Let's now quickly recall something about sperm:

Did you know that these are the smallest cells of the human body? They contain only tightly-packed genetic information, in a small amount of watery fluid, some mitochondria (which power the sperm's journey through the woman's cervix), and a long tail. They wear a hat, called the acrosome that contains substances to help dissolve barriers when penetrating the egg. In addition to being small and dry, sperm are MANY; millions get expelled in a single orgasm.

As a rough comparison, your boyfriend's sperm could be frozen at home with

the reasonable expectation that, after thawing there will still be enough guys left and viable enough to produce more babies than you can handle.

And what about eggs?

Eggs are some of the most delicate cells in the body—they are HUGE and filled with sensitive materials that swim in a watery fluid.

Because of the high water content in all cells, *ice crystals cause damage to them* as they freeze and thaw. Besides, the outer layer of the egg often becomes hardened, making it more difficult to fertilize them.

The big progress in egg freezing is that the new technology bypasses the formation of ice crystals, in the way that eggs are dehydrated before freezing and rehydrated after thawing. But still, you would need to freeze many to be reasonably certain that you will someday become a mother of children who genetically belong to you.

To summarize, egg freezing is an awesome technology. Every day we should take a deep breath and just feel grateful for things like egg freezing, IVF, ovulation tests, and many other treatments and procedures we often take for granted.

*Unfortunately, egg freezing produces better outcomes for younger women, with good quality eggs. It is not a question of technology, but of our biological limitations and that will not change any time soon.*

As unfair as it sounds, when it comes to thawing eggs and sperm in the lab, it compares to thawing a piece of frozen wood with a package of fresh strawberries—that is roughly the challenge for embryologists.

For that reason alone, young women who wish to freeze their eggs should select the best clinic possible. Women of thirty-five or above should not waste time and resources on egg freezing, but focus their energy on improving the quality of the eggs they still have.

## Alternatives to freezing eggs for women over thirty-five

Even with frozen eggs, things can go wrong. You may find out that the procedure of taking eggs out is harsher than you imagined, or that it takes longer than expected to retrieve 20 eggs or more to freeze. This means you may need to repeat the procedure, which, in addition to being costly, is also unpleasant.

Probably the most disturbing question a woman could confront along the way is this one:

What will you do if doctors let you know your egg reserve is already quite exhausted and freezing is not a reasonable option anymore?

What will happen then? How fast could you accept the fact that you might have missed your fertility train? How far are you ready to go to catch it? In that case, it might be a good idea to:

Go home and start making a baby before the remaining eggs disappear, or;

Have your eggs fertilized with your partner's (or donor's) sperm.

In this way you create *embryos*, which is a much better alternative for women over thirty-five in terms of increasing chances of becoming a mother of children that genetically belong to you.

The reason is that *embryos are more robust than eggs* and generally survive thawing better.

Embryos also have a much better chance of progressing into a healthy pregnancy and live birth.

Embryos are babies already, in the sense that *both mom and dad's genes* are in one place and you don't need to worry whether the fertilization step will work.

*In conclusion, if you are thirty-five or older and for any reason can't start having babies, then you probably wish to circumvent the biological clock for a few*

*years. In that case, freezing embryos and NOT eggs is a much better solution in terms of the probability of a future successful pregnancy.*

A woman's body can sustain pregnancy at over forty years of age relatively easily.

This means that, even when your eggs are someday gone, you can go back to the clinic and use your banked embryos. The advantages are that: 1) these are genetically your babies; 2) your chances of getting pregnant with them will be similar to those of younger women; and, 3) you will not have to worry whether your frozen eggs will survive thawing and be able to be fertilized.

Simplified, embryos are a more advanced stage of life and are able to operate on a more robust level compared to eggs.

The disadvantage of course is that embryos can't exchange fathers any more—they are stuck with the DNA of your husband, partner, or donor as you chose him at the time of conception. This means that if you should have another partner at the time you actually try to get pregnant with earlier frozen embryos the children will be genetically related only to you.

# LAST TRAIN RECIPE

Here is a summary of foods, supplements and activities which will help you maximize your egg quality and improve chances to get pregnant. Beware of side effects – your health and mood might improve, too!

## The day starts with magic

~ Prenatal vitamins (any well-known brand with at least 400-800µg folic acid will do)

~ 2000IU of vitamin D

~ 600mg CoQ10

~ 300mg of omega-3 fatty acids (DHA and EPA combined)

~ Women over thirty-five: 50mg of DHEA (consult your health-care advisor if supplementing over a long time)

*Start three to six months before trying to get pregnant*

## What to eat and drink: A few ideas to begin with

*Animal products:* eggs, seafood (fatty fish), meat, wild game, dairy (milk, yogurt, *cheese*).

*Vegetables:* spinach, broccoli, tomatoes, peppers, potatoes, carrots, cucumber, celery, lentils, beans, artichokes, eggplant, onion, peas, lettuce, green salad, mushrooms.

*Fruits:* apples, berries, grapefruit, cherries, dates, peaches, lemon, avocado, coconut.

*Snacks:* nuts – walnuts, almonds, cashews, pistachio. Natural dried fruits.

*Cooking fats:* olive oil, butter, coconut oil.

*Drinks:* water, tea and coffee (not more than 1-2 cups). Red wine (in moderate amounts).

*Limit:* refined sugars and grains, soft drinks, margarine, sweets, and processed food in general. Eat organic-raised plants and animals whenever possible!

## **Important extras (encouraged every day):**

Laughs, good company, physical activities

Spending time in the sunshine, working on projects which make you fulfilled

Relaxation, plenty of sleep

*Good luck!*

## **Bibliography relevant to biological clock, ovarian reserve, and lifestyle in general**

Axmon A, Rylander L, Albin M, Hagmar L. Factors affecting time to pregnancy. *Hum Reprod.* 2006 May;21(5):1279-84.

Ebner T, Sommergruber M, Moser M, Shebl O, Schreier-Lechner E, Tews G. Basal level of anti-Müllerian hormone is associated with oocyte quality in stimulated cycles. *Hum. Reprod.* (2006) 21 (8): 2022-2026.

Bentzen JG, Forman JL, Larsen EC, Pinborg A, Johannsen TH, Schmidt L, Friis-Hansen L, Nyboe Andersen A. Maternal menopause as a predictor of anti-Müllerian hormone level and antral follicle count in daughters during reproductive age. *Hum Reprod.* 2013 Jan;28(1):247-55.

Greenseid K, Jindal S, Hurwitz J, Santoro N, Pal L. Differential granulosa cell gene expression in young women with diminished ovarian reserve. *Reprod Sci.* 2011 Sep;18(9):892-9.

Hewlett BS, Hewlett BL (2010). Sex and searching for children among Aka foragers and Ngandu farmers of Central Africa. *African Study Monographs*, 31(3): 107-125.

Shostak, Marjorie (1981). *Nisa, the life and words of a !Kung woman.* Cambridge, MA: Harvard University Press.

Talukdar N, Bentov Y, Chang PT, Esfandiari N, Nazemian Z, Casper RF. Effect of long-term combined oral contraceptive pill use on endometrial thickness. *Obstet Gynecol.* 2012 Aug;120(2 Pt 1):348-54.

Wallace WHB, Kelsey TW (2010). Human Ovarian Reserve from Conception to the Menopause. *PLoS ONE* 5(1):e8772.doi:10.1371/journal.pone.0008.

## **Bibliography relevant to nutrition**

Eaton SB, Konner M, Shostak M. Stone agers in the fast lane: chronic degenerative diseases in evolutionary perspective. *Am J Med.* 1988 Apr;84(4):739-49.

Gao X, Chen H, Fung TT. Prospective study of dietary pattern and risk of Parkinson disease. *Am J Clin Nutr* 2007 86:1486–94.

<http://www.mayoclinic.com/health/mediterranean-diet/CL00011>

Juhl M, Olsen J, Andersen AM, Grønbaek M. Intake of wine, beer and spirits and waiting time to pregnancy. *Hum Reprod.* 2003 Sep;18(9):1967-71.

Konner M, Eaton SB. Paleolithic nutrition: twenty-five years later. *Nutr Clin Pract.* 2010 Dec;25(6):594-602.

Matorras R, Ruiz JI, Mendoza R, Ruiz N, Sanjurjo P, Rodriguez-Escudero FJ. Fatty acid composition of fertilization-failed human oocytes. *Hum Reprod.* 1998 Aug;13(8):2227-30.

Pontzer H, Raichlen DA, Wood BM, Mabulla AZ, Racette SB, Marlowe FW. Hunter-gatherer energetics and human obesity. *PLoS One.* 2012 7(7):e40503.

Selesniemi K, Lee HJ, Muhlhauser A, Tilly JL. Prevention of maternal aging-associated oocyte aneuploidy and meiotic spindle defects in mice by dietary and genetic strategies. *Proc Natl Acad Sci U S A.* 2011 Jul 26;108(30):12319-24.

Sofi F, Abbate R, Gensini GF, Casini A. Accruing evidence on benefits of adherence to the Mediterranean diet on health: an updated systematic review and meta-analysis. *Am J Clin Nutr.* 2010 Nov;92(5):1189-96.

Ströhle A, Hahn A, Sebastian A. Latitude, local ecology, and hunter-gatherer dietary acid load: implications from evolutionary ecology. *Am J Clin Nutr.* 2010 Oct;92(4):940-5.



Ströhle A, Hahn A. Diets of modern hunter-gatherers vary substantially in their carbohydrate content depending on ecoenvironments: results from an ethnographic analysis. *Nutr Res.* 2011 Jun;31(6):429-35.

Toledo E, Lopez-del Burgo C, Ruiz-Zambrana A, Donazar M, Navarro-Blasco I, Martínez-González MA, de Irala J. Dietary patterns and difficulty conceiving: a nested case-control study. *Fertil Steril.* 2011 Nov;96(5):1149-53.

Twigt JM, Bolhuis ME, Steegers EA, Hammiche F, van Inzen WG, Laven JS, Steegers-Theunissen RP. The preconception diet is associated with the chance of ongoing pregnancy in women undergoing IVF/ICSI treatment. *Hum Reprod.* 2012 Aug;27(8):2526-31.

Vujkovic M, de Vries JH, Lindemans J, Macklon NS, van der Spek PJ, Steegers EA, Steegers-Theunissen RP. The preconception Mediterranean dietary pattern in couples undergoing in vitro fertilization/intracytoplasmic sperm injection treatment increases the chance of pregnancy. *Fertil Steril.* 2010 Nov;94(6):2096-101.

## **Bibliography relevant to egg quality, mitochondria, and the nutritional supplements: folic acid, vitamin D, DHEA, CoQ10, and omega-3.**

Barad D, Gleicher N. Effect of dehydroepiandrosterone on oocyte and embryo yields, embryo grade and cell number in IVF. *Hum Reprod.* 2006 Nov;21(11):2845-9.

Barad DH, Gleicher N. Increased oocyte production after treatment with dehydroepiandrosterone. *Fertil Steril.* 2005 Sep;84(3):756.

Bentov Y, Hannam T, Jurisicova A, Esfandiari N, Casper RF. Coenzyme Q10 Supplementation and Oocyte Aneuploidy in Women Undergoing IVF–ICSI Treatment. *Clin Med Insights Reprod Health.* 2014; 8: 31–36.

Bentov Y, Esfandiari N, Burstein E, Casper RF. The use of mitochondrial nutrients to improve the outcome of infertility treatment in older patients. *Fertil Steril*. 2010 Jan;93(1):272-5.

Bentov Y, Yavorska T, Esfandiari N, Jurisicova A, Casper RF. The contribution of mitochondrial function to reproductive aging. *J Assist Reprod Genet*. 2011 Sep;28(9):773-83.

Candito M, Rivet R, Herbeth B, Boisson C, Rudigoz RC, Luton D, Journal H, Oury JF, Roux F, Saura R, Vernhet I, Gaucherand P, Muller F, Guidicelli B, Heckenroth H, Poulain P, Blayau M, Francannet C, Roszyk L, Brustié C, Staccini P, Gérard P, Fillion-Emery N, Guéant-Rodriguez RM, Van Obberghen E, Guéant JL. Nutritional and genetic determinants of vitamin B and homocysteine metabolisms in neural tube defects: a multicenter case-control study. *Am J Med Genet A*. 2008 May 1;146A(9):1128-33.

Chavarro JE, Rich-Edwards JW, Rosner B, Willett WC. A prospective study of dairy foods intake and anovulatory infertility. *Hum Reprod*. 2007 May;22(5):1340-7. Epub 2007 Feb 28.

Chavarro JE, Rich-Edwards JW, Rosner BA, Willett WC. Protein intake and ovulatory infertility. *Am J Obstet Gynecol*. 2008 Feb;198(2):210.e1-7. doi: 10.1016/j.ajog.2007.06.057.

Chavarro JE, Rich-Edwards JW, Rosner BA, Willett WC. Use of multivitamins, intake of B vitamins and risk of ovulatory infertility. *Fertil Steril*. 2008 March; 89(3): 668–676.

Dominguez-Salas P, Cox SE, Prentice AM, Hennig BJ, Moore SE. Maternal nutritional status, C(1) metabolism and offspring DNA methylation: a review of current evidence in human subjects. *Proc Nutr Soc*. 2012 Feb;71(1):154-65.

Forster DA, Wills G, Denning A, Bolger M. The use of folic acid and other vitamins before and during pregnancy in a group of women in Melbourne,

Australia. *Midwifery*. 2009 Apr;25(2):134-46.

Gleicher N, Barad DH. Dehydroepiandrosterone (DHEA) supplementation in diminished ovarian reserve (DOR). *Reprod Biol Endocrinol*. 2011 May 17;9:67.

Hammiche F, Laven JS, van Mil N, de Cock M, de Vries JH, Lindemans J, Steegers EA, Steegers-Theunissen RP. Tailored preconceptional dietary and lifestyle counselling in a tertiary outpatient clinic in The Netherlands. *Hum Reprod*. 2011 Sep;26(9):2432-41.

Hammiche F, Vujkovic M, Wijburg W, de Vries JH, Macklon NS, Laven JS, Steegers-Theunissen RP. Increased preconception omega-3 polyunsaturated fatty acid intake improves embryo morphology. *Fertil Steril*. 2011 Apr;95(5):1820-3.

Holick MF. Evidence-based D-bate on health benefits of vitamin D revisited. *Dermatoendocrinol*. 2012 Apr 1;4(2):183-90.

<http://seronosymposia.org/documents/L16Casper.pdf?id=242>

Kim JY, Kinoshita M, Ohnishi M, Fukui Y. Lipid and fatty acid analysis of fresh and frozen-thawed immature and in vitro matured bovine oocytes. *Reproduction*. 2001 Jul;122(1):131-8.

Lerchbaum E, Obermayer-Pietsch B. Vitamin D and fertility: a systematic review. *Eur J Endocrinol*. 2012 May;166(5):765-7.

Liu M, Yin Y, Ye X, Zeng M, Zhao Q, Keefe DL, Liu L. Resveratrol protects against age-associated infertility in mice. *Hum Reprod*. 2013 Mar;28(3):707-17.

Liu S, Li Y, Gao X, Yan JH, Chen ZJ. Changes in the distribution of mitochondria before and after in vitro maturation of human oocytes and the effect of in vitro maturation on mitochondria distribution. *Fertil Steril*. 2010 Mar 15;93(5):1550-5.

May-Panloup P, Chrétien MF, Jacques C, Vasseur C, Malthièry Y, Reynier P. Low oocyte mitochondrial DNA content in ovarian insufficiency. *Hum Reprod*.

2005 Mar;20(3):593-7.

Monteagudo C, Mariscal-Arcas M, Palacin A, Lopez M, Lorenzo ML, Olea-Serrano F. Estimation of dietary folic acid intake in three generations of females in Southern Spain. *Appetite*. 2013 Aug;67:114-8.

Morales AJ, Haubrich RH, Hwang JY, Asakura H, Yen SS. The effect of six months treatment with a 100 mg daily dose of dehydroepiandrosterone (DHEA) on circulating sex steroids, body composition and muscle strength in age-advanced men and women. *Clin Endocrinol (Oxf)*. 1998 Oct;49(4):421-32.

Nehra D, Le HD, Fallon EM, Carlson SJ, Woods D, White YA, Pan AH, Guo L, Rodig SJ, Tilly JL, Rueda BR, Puder M. Prolonging the female reproductive lifespan and improving egg quality with dietary omega-3 fatty acids. *Aging Cell*. 2012 Dec;11(6):1046-54.

Ozkan S, Jindal S, Greenseid K, Shu J, Zeitlian G, Hickmon C, Pal L. Replete vitamin D stores predict reproductive success following in vitro fertilization. *Fertil Steril*. 2010 Sep;94(4):1314-9.

Reinhold Vieth. Why the optimal requirement for Vitamin D3 is probably much higher than what is officially recommended for adults. *Journal of Steroid Biochemistry & Molecular Biology* 89–90 (2004) 575–579.

Rudick B, Ingles S, Chung K, Stanczyk F, Paulson R, Bendikson K. Characterizing the influence of vitamin D levels on IVF outcomes. *Hum Reprod*. 2012 Nov;27(11):3321-7.

Santos TA, El Shourbagy S, St John JC. Mitochondrial content reflects oocyte variability and fertilization outcome. *Fertil Steril*. 2006 Mar;85(3):584-91.

Seifer DB, DeJesus V, Hubbard K. Mitochondrial deletions in luteinized granulosa cells as a function of age in women undergoing in vitro fertilization. *Fertil Steril*. 2002 Nov;78(5):1046-8.

Souberbielle JC, Body JJ, Lappe JM, Plebani M, Shoenfeld Y, Wang TJ, Bischoff-Ferrari HA, Cavalier E, Ebeling PR, Fardellone P, Gandini S, Gruson D, Guérin AP, Heickendorff L, Hollis BW, Ish-Shalom S, Jean G, von Landenberg P, Largura A, Olsson T, Pierrot-Deseilligny C, Pilz S, Tincani A, Valcour A, Zittermann A. Vitamin D and musculoskeletal health, cardiovascular disease, autoimmunity and cancer: Recommendations for clinical practice. *Autoimmun Rev.* 2010 Sep;9(11):709-15.

Stegers-Theunissen RP. Preconception folic acid treatment affects the microenvironment of the maturing oocyte in humans. *Fertil Steril.* 2008 Jun;89(6):1766-70.

Tilly JL, Sinclair DA. Germline Energetics, Aging, and Female Infertility. *Cell Metab.* 2013; 17(6): 838-50. doi:10.1016/j.cmet.2013.05.007.

Tummala S, Svec F. Correlation between the administered dose of DHEA and serum levels of DHEA and DHEA-S in human volunteers: analysis of published data. *Clin Biochem.* 1999 Jul;32(5):355-61.

## **Bibliography related to acupuncture and relaxation techniques**

Bovey M, Lorenc A, Robinson N. Extent of acupuncture practice for infertility in the United Kingdom: experiences and perceptions of the practitioners. *Fertil Steril.* 2010 Dec;94(7):2569-73.

Manheimer E, van der Windt D, Cheng K, Stafford K, Liu J, Tierney J, Lao L, Berman BM, Langenberg P, Bouter LM. The effects of acupuncture on rates of clinical pregnancy among women undergoing in vitro fertilization: a systematic review and meta-analysis. *Hum Reprod Update.* 2013 Jun 27. [Epub ahead of print].

Meldrum DR, Fisher AR, Butts SF, Su HI, Sammel MD. Acupuncture-help,

harm, or placebo? *Fertil Steril*. 2013 Jun;99(7):1821-4.

Quant HS, Zapantis A, Nihsen M, Bevilacqua K, Jindal S, Pal L. Reproductive implications of psychological distress for couples undergoing IVF. *J Assist Reprod Genet*. 2013 Sep 17. [Epub ahead of print]

Rashidi BH, Tehrani ES, Hamedani NA, Pirzadeh L. Effects of acupuncture on the outcome of in vitro fertilisation and intracytoplasmic sperm injection in women with polycystic ovarian syndrome. *Acupunct Med*. 2013 Jun;31(2):151-6.

Rojansky N, Benshushan A, Meirsdorf S, Lewin A, Laufer N, Safran A. Seasonal variability in fertilization and embryo quality rates in women undergoing IVF. *Fertil Steril*. 2000 Sep;74(3):476-81.

Wakeman S, Benny P. Is it possible to predict a fertile cycle? Uteroovarian blood flow parameters in conception versus nonconception cycles. *Fertil Steril*. 2009 Jun;91(6):2726-31.

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