

# Creando

## FAMILIAS



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# Editorial

Dr. José Jesús López Gálvez  
CEO of the UR Group



What has been a very special 2023 for Grupo International UR is drawing to an end.

It seems like only yesterday we set up as UR Group, even though this year we celebrated our **40th anniversary**. The time has flown by because those of us who are part of this journey feel blessed to work in Reproduction.

Through the years, we have played an active role in the incredible changes that this field of medicine has undergone, making us much more efficient, achieving things that we could only dream of back when we started out.

Engaged in bringing life into the world, nothing beats the unique and special feeling of helping our patients fulfil their dream of having children. Their desire drives us to do better, to foster the development of new techniques while **improving efficiency and quality** as well as creating a positive feedback that inspires us day after day to continue along the path of constantly

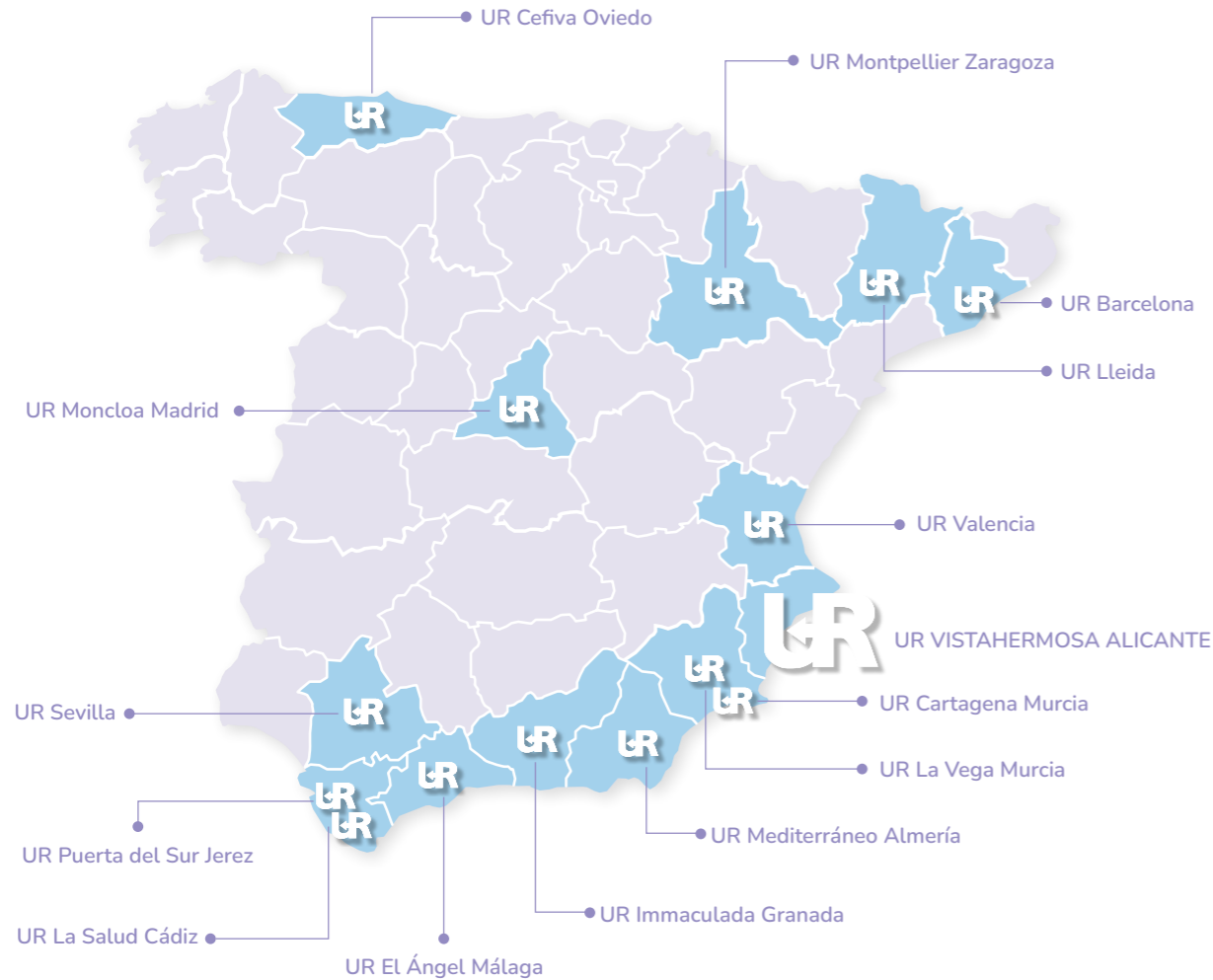
keeping up with industry trends. Society needs our services for the time being; given that people are waiting longer to become parents, due to a wide range of social and medical reasons. Once again, in Spain this year the mortality rate is higher than the birth rate.

Therefore, the future is paving the way for a **more efficient model**, in which Artificial Intelligence will play a big part and all geared towards a more sustainable way of doing things...

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*Grupo International UR will always be there, as eager as ever, but striving at all times to improve, to keep learning and to ensure that our patients' biggest dream comes true: TO BRING HOME A HEALTHY BABY.*

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# SECURE SELECT

## The most innovative non-invasive embryo chromosomal selection

**Dr. Antonio Urbano**  
Director of the Genetics Laboratory -  
UR Group International

The end goal of Reproductive Medicine is for a healthy baby to be born. Genetic testing helps couples undergoing assisted reproduction in a number of ways. Of the tests performed, those related to the chromosome analysis of the embryos are of the utmost importance, because chromosomal aberrations show up frequently in human embryos, and are responsible for **98%** of the embryos with these alterations not implanting, resulting in a miscarriage and, in short,

not achieving the objective of giving birth to a healthy baby.

**Secure Select prioritizes the transfer of embryos that have a greater implantation capacity.**

Secure Select is the most innovative **non-invasive chromosome screening** technique. A non-invasive pre-implantation genetic test that prioritises the

transfer of embryos with a greater implantation potential according to their chromosomal endowment, without having to carry out an embryo biopsy. This is possible because **next-generation sequencing or NGS technologies** can detect the DNA that the embryo has shed into the culture medium where it is developing and, in turn, estimate whether the embryo has the correct number of chromosomes.

Genetic testing of embryos provides information on the chromosomal status of the embryo with a concordance of between **78% to 83%** with respect to the embryo biopsy, permitting the selection of embryos that are more likely to be chromosomally normal and, in turn, have a higher implantation rate.

### PGT-A ni

The first step in this process is to perform In Vitro Fertilisation (IVF). If the process is successful, the fertilised egg will transform into an embryo that will be cultured until day three/four of development. It is subsequently washed and transferred to a new culture medium, where it will develop until day five/six (expanded blastocyst stage).

At this stage, the embryo is preserved using vitrification (freezing) and the culture medium is collected for genetic analysis by mass spectrometry or next-generation sequencing (NGS). Once the results have been obtained, priority will be given to transferring the embryos that are most likely to implant.

### Advantages of Secure Select

- No embryonic manipulation.
- Reduced clinical costs, as no embryo biopsy is performed.
- The embryos with the highest implantation potential can be determined according to their chromosomal endowment in a non-invasive way.
- Helps couples conceive in less time.
- It is the best and safest non-invasive embryo prioritisation method.
- It can detect embryos at high risk of chromosomal disorders.

### MAIN RECOMMENDATIONS

Genetic testing is for patients looking for non-invasive chromosomal information, with a view to determining which embryos to transfer first on the basis of chromosomal endowment and which, in turn, have the highest implantation potential.

Secure Select is particularly useful for couples who have obtained a large number of embryos in the in vitro fertilisation process.



Secure Select is a breakthrough in embryo selection that analyses DNA present in the culture medium, as the embryo is not manipulated. Thanks to this advanced embryo selection, couples can increase their chances of a successful IVF cycle compared to conventional embryo selection.

# NAPROTECHNOLOGY

## MYTH OR REALITY

Dr. Salvador García Aguirre  
Medical Director  
UR HLA Montpellier Zaragoza

NaProtechnology was developed in the USA by Thomas Hilgers in the 90s. The term gets its name from natural procreation technology and doctors who use it strive to get to the bottom of what is causing infertility while seeking to **improve the couple's natural reproductive capacity.**

It is also known as restorative reproductive medicine.

Specialists see it as an alternative to assisted reproductive technologies (ART) when couples, for a myriad of reasons, opt against ART because they believe it involves embryo manipulation.

The system follows the Creighton model, a standardised modification of the more classical Billings ovulation method developed by John and Evelyn Billings in 1960. It is a **cycle monitoring system that records biomarkers such as cycle length**, cervical mucus characteristics, menstrual pain and menstruation type. These data are analysed on a graph to evaluate possible causes of infertility and to identify the most appropriate days of the cycle for diagnostic tests to be performed.

It also looks at identifying factors that could affect male fertility. Furthermore, it strives to identify other pathologies that could cause infertility such as food intolerances, autoimmune diseases, hormonal alterations, endometriosis or perhaps even ovulation disorders.

According to research published in the *Journal of American Board of Family Medicine*, **52.8% of couples who followed these guidelines conceived within 24 months.**



## Complementary technique to Assisted Reproductive Technology

In my opinion, **NaProtechnology is not an alternative to ART; it can be used in a complementary manner** (except for couples who opt against ART). Gynaecologists look into the possible causes of why couples are infertile and, if they can be solved without the need for ART, they follow the relevant treatments and procedures.

Gynaecologists, and even primary care units, should recommend that women or couples looking to conceive **lead a healthy lifestyle, give up toxic habits, treat immunological diseases** (with the help of specialists) or treat endometriosis medically or surgically, if indicated.

Couples should also be informed of changes in cervical mucus throughout the cycle, as well as basal temperature charts with a view to predicting ovulation. After being diagnosed and the treatment suggested by the gynaecologist has been followed, if conception has not occurred in a time that is appropriate for the woman's age, it is only then that she should be referred to a specialised Reproduction Unit. In this unit, the clinical history is looked at again, and any tests that have not been carried out until now are performed and, furthermore, if she still has not conceived after following the aforementioned guidelines, ART is recommended.

In this regard, **natural methods should be recommended to all couples** looking to have a child, as long as they are not being caused undue stress, and not just to couples who are having difficulties conceiving. Furthermore, should conception not be possible within the recommended timeframe (due to infertility of unknown origin, or because there are more severe causes that cannot be solved by natural methods), they should be referred to an Assisted Reproduction Unit.

# Preparing for IN VITRO FERTILISATION AT HOME

**Dr. Lourdes Flores**  
Medical Director - UR Crea México

Couples who, for one reason or another, turn to In Vitro Fertilisation (IVF) treatment to start a family are full of doubts throughout the process, not to mention dealing with the uncertainty of whether it will go as planned or not.

From a couple's financial and emotional point of view, undergoing reproductive treatment brings no shortage of questions to the table.

**I HOPE THE FOLLOWING TIPS WILL BE USEFUL FOR TIMES LIKE THESE.**

## 1. Make sure you are relaxed throughout the process.

Do an activity that relieves your stress. If you work, request some time off for the procedure to focus on what you need to do, schedule your appointment at a convenient time with your doctor, and take your medication at home. This way, you won't have to inject your medication at times it doesn't suit you or take it with you to the office.

## 2. Set an alarm to take your medication.

Keep a diary or a calendar and write down what medication you have taken and when. Nerves or stress can often play tricks on you; so you might miss a dose or take a double dose, both of which can affect the treatment.

## 3. Take all decisions as a couple.

There might be times when your partner is unable to attend the consultation with you, however, try not to make decisions alone; they should always be discussed. Even if they are things you think you can deal with on your own, do not take full responsibility; ask your doctor any questions you have, in particular any medicine-related questions, to prevent setbacks.

## 4. Don't get rid of your pets.

They can accompany you throughout the process. They can be part of this journey as long as they are well vaccinated, clean and dewormed.

## 5. Follow your doctor's orders.

Pay no heed to outside opinions based on their personal experiences. Remember that each case is unique and different.

## 6. On the day the egg-retrieval technique is performed.

Do not wear nail polish or have recently dyed hair. If your partner is unable to stay until the end of the procedure for work-related reasons and you are recovering, ask a family member or friend to accompany you so that you don't have to go home on your own.

## 7. On the day of the embryo transfer, you should be accompanied by your partner,

if possible, so you can both experience the process. Afterwards, we recommend getting at least 3 or 4 days' rest at home, so line up a movie marathon, read a book or watch a TV series. Stick to your usual eating routine and keep taking your medication at the indicated time.

## 8. Do not change or stop taking any medication,

each medicine has a special function; if you stop taking one, you could alter the outcome.

## 9. Take the pregnancy test on the indicated day,

not before or after, as you might get a false positive or false negative and get distressed, causing you to make an unneeded change; so be patient.

## 10. Take some alternative medicines if you want:

for example acupuncture or magnet therapy, if you think it will boost your confidence, although you must follow your doctor's orders to the letter at all times. Managing stress is of the utmost importance, because otherwise it could hamper good treatment results.



# THE OPTIMAL LEVEL OF PHYSICAL ACTIVITY

to increase the chances of successful fertility treatments

**Bernardo Fernández Martos**  
Nurse - UR HLA Vistahermosa

It is well known that getting regular exercise is very good for health and improves life quality, as it prevents coronary heart disease, burns fat, increases respiratory capacity, improves physical performance, cardiovascular condition and boosts well-being.

Nevertheless, when undergoing assisted reproduction treatment, people often wonder what **optimal level of physical activity is recommended** to make treatments more successful while increasing the prob-

ability of conceiving, and if so, to mitigate the chances of miscarriage and/or complications inherent to the techniques used. This is where infertility patients turn to professionals looking for advice on what to do and what not to do.

There are a myriad of studies, for example, those that look at the behaviours and beliefs of women with regard to physical activity while undergoing assisted reproduction treatments. They show that patients **significantly decreased their levels of physical activity** because they believed that not limiting their physical activity and keeping up pre-treatment levels would negatively affect their chances of success. Other studies show that early mobilisation post-embryo transfer does not affect the chances of conceiving; and in other studies, women who are **more physically active during treatment** have a higher implantation and full-term pregnancy rate.

However, there are not many studies that have gone so far as to offer an exact recommendation on what the most optimal physical activity to perform is or what to avoid when undergoing assisted reproduction techniques, and even less so when it comes to different types of sport and disciplines.

An extremely important aspect to bear in mind when planning physical activity is the potential complications inherent in undergoing reproductive treatments. Therefore, one of the most severe complications that can occur is **Ovarian Hyperstimulation Syndrome (OHSS)**. Two of the main characteristics of OHSS, increased ovarian size and increased coagulability, will determine the need for a specific physical activity regime depending on the severity of the case. Therefore, **physical activity should be limited** in direct relation to the degree of **abdominal discomfort**, with

a view to reducing the risk of ovarian torsion. However, complete bed rest is not recommended, as hyperoestrogenism predisposes them to **thromboembolisms**, and sitting for long periods of time is also not advisable. Therefore, **walking at a gentle pace**, which does not lead to or increases discomfort, is usually the most recommended form of physical activity.

In severe cases of OHSS, requiring hospital monitoring, **strict bed rest** is mandatory and other measures must be taken to prevent thromboembolic phenomena. For these patients, passive lower limb mobilisation and isometric muscle contraction may be enough for the duration of bed rest, encouraging early ambulation as soon as the OHSS condition allows.

The other major complication is **ovarian torsion**. The appearance of this phenomenon induced by physical exercise has even been seen in patients after cycles of controlled hyperstimulation, even in natural cycles after a stimulated cycle that did not lead to conception, due to the persistence of luteal cysts; therefore physical activity should be limited until at least **one or two cycles** post-treatment.



Due to the paucity of studies and specific research in this regard, the most reasonable recommendations would be to adapt physical activity levels on a case-by-case basis while undergoing assisted reproductive treatments, mainly following common sense while taking into account:

- THE RISK OF COMPLICATIONS.
- HOW LONG THE PERSON HAS BEEN TRYING FOR A BABY and how difficult it has been to conceive.
- STRIKING THE RIGHT BALANCE so as to lead a lifestyle that deviates as little as possible with a view to avoiding additional emotional disturbances in patients.

Therefore, to avoid complications, the intensity of the exercise should be reduced during ovarian stimulation,

as well as in the subsequent cycle, even if pregnancy has not yet been possible. **Gentle activities** such as walking, swimming, stationary cycling are recommended as well as leading a normal life as long as it does not call for any significant physical exertion.

For patients who are used to doing sport, they will be asked to **reduce training levels to an aerobic level**, avoiding continuous impact disciplines at all times: running, road/mountain cycling, horse riding, step, contact sports, etc.; as well as trunk flexion overworking the abdominal muscles: sit-ups, weight lifting, martial arts, skiing, and some movements such as serving in tennis and swinging in golf. On the one hand, all of this strives to **minimise the risk of ovarian torsion** and, on the other hand, avoid **uterine contractions** that could jeopardise embryo implantation.

Other activities such as **yoga and meditation** can help women going through infertility treatment. Relaxation techniques can help clear the mind, maintain a healthy body balance, and make it easier for patients to be patient when undergoing the rigours of fertility treatments.

### In short:



# THE IMPORTANCE OF WEIGHT in Assisted Reproduction

Dr. María Gallego  
Gynaecologist - UR El Angel de Màlaga



THE WORLD HEALTH ORGANISATION (WHO) DEFINES OBESITY AS:  
The abnormal or excessive accumulation of fat that can harm health and has direct consequences on the fertility of women and men. Negatively affects on the effectiveness of assisted reproduction techniques and poses a risk to the development of pregnancy.



Obesity is a complex and multifactorial disease.

The calorie intake – expenditure balance that ultimately leads to obesity is affected by a number of factors including nutrition, physical activity, stress, age, sleep, genetic factors, drug intake, microbiota, endocrine disruptors, hormonal alterations, socio-economic factors, psychiatric illnesses and prenatal factors.

## How it can be measured

The **Body Mass Index (BMI)** is a mathematical formula that takes into account the patient's weight and height:

<b>Normal weight</b> BMI 18,5-24,9
<b>Overweight</b> BMI 25-29,9
<b>Obesity</b> BMI > 30
<b>Class III Obesity</b> BMI > 40

### Waist circumference

According to the WHO, a maximum healthy value of **88 cm for women and 102 cm for men**.

## Effects of obesity on health

Obesity has negative health effects and is linked to social problems, mental health issues, chronic lung disease, cardiovascular disease, fatty liver disease, chronic kidney disease, musculoskeletal and joint disease, metabolic diseases, increased risk of thirteen different types of cancer and hormonal disturbances and infertility.

## Magnitude of the problem

Obesity is a chronic disease and a public health problem. It is considered the greatest epidemic of the 21st century. In 2004, the WHO came up with a prevention strategy called "Diet, Physical Activity and Health" to tackle it. Global prevalence is **20%** and has **tripled in the last decade**. In Spain, the prevalence is similar and, if overweight people are included, the figures stand at **44% of men and 31% of women**. Annual health expenditure in Spain on obesity-related health complications is **9.7%** of total expenditure. In the latest WHO report published in May this year, it is estimated that obesity causes more than **1.2 million deaths** a year in Europe. In Europe, obesity is estimated to be responsible for at least 200,000 new cancer cases each year. Obesity is expected to overtake smoking as a preventable risk factor in the coming decades in some European countries.

## Obesity and fertility

We know that obesity lowers fertility in men and women as well as increasing the length of time it takes to conceive. In men, it is estimated that for every 9 kg of excess weight, there is a **10% increase in the risk of infertility**. As for women, it is estimated that, for each point increase in BMI, the probability of **spontaneous pregnancy** goes down by **10%** (SEEN obesity group), and by as much as **50%** in cases of severe obesity.

## Action mechanisms

In men, it **alters hormones** (decreases testosterone, increases oestrogen), leads to **physical changes** (increase in scrotal temperature, greater risk of erectile dysfunction), and affects **semen** (concentration, mobility and morphology).

A number of **metabolic and endocrine alterations** occur in women that lead to:

- ALTERATIONS IN FOLLICULAR DEVELOPMENT AND OVULATION
- DECREASE IN OOCYTE AND EMBRYO QUALITY
- ENDOMETRIAL INVOLVEMENT: altered decidualisation and receptivity

## Obesity and assisted reproduction

In developed countries: **obesity levels are between 30-50%** in women and men of reproductive age. In our environment: in recent years, obesity, as well as age, has become the biggest factor that has led to the decrease in fertility. It therefore comes as no surprise that we are increasingly coming across this patient profile in our clinics. According to the WHO, patients with a BMI over 30 face the following problems in assisted reproduction techniques:

- **Cancellation** of in vitro fertilisation treatment cycles are on the rise.
- **Decrease** in embryo implantation rates
- **Increased** rate of miscarriage
- **Decrease in live birth rates:** for each point increase in BMI, the live birth rate goes down by **9%** (SEEN obesity group).



As a result of the foregoing, it can be concluded that obese patients have decreased prognosis in assisted reproduction techniques using their own eggs and with donated eggs alike.

## Excess weight and pregnancy

30% of pregnant women in Western countries are obese.

This entails a number of risks:

### During pregnancy

Higher rate of miscarriages and foetal malformations, premature birth, gestational diabetes, hypertensive states, thrombosis, foetal death, prolonged pregnancy.

### Durante el parto

Foetal macrosomia and shoulder dystocia, high anaesthetic risk and increased caesarean section rate.

### Post-birth

Thrombosis, increased infections, postpartum depression.

## Effects of obesity on offspring

Children born to obese mothers are at an increased risk of developing cardiovascular disease, obesity, metabolic syndrome and type II diabetes in adolescence and adulthood, as well as an increased **risk of neurological disorders** (infantile cerebral palsy, autism, anxiety-depression, eating disorders).

## How can I lose weight?

It is of the utmost importance to set a **realistic weight loss and maintenance goal to avoid a rebound effect.**

It is extremely important to work with a multidisciplinary team of experts in obesity and fertility to come up with personalised programmes to achieve the goal within a reasonable 3-6-month timeframe.

## THERE ARE 4 STRATEGIES:

### 1. Low-calorie diet

- **Varied and balanced Mediterranean diet** with smaller portion sizes.
- **Reduce fat consumption** (butter, sausages, ready meals, etc).
- **Avoid intake of sugar and sweets.**
- **Consume fruit and vegetables** on a daily basis and eat more pulses and nuts.
- **Drink skimmed or semi-skimmed dairy products.**

### 2. Physical activity

It is of the utmost importance to remain active and avoid a sedentary lifestyle. **150 minutes per week of moderate aerobic exercise** is recommended (dancing, walking, etc.) along with **1-3 sessions per week of resistance training.**

### 3. Drugs

These are recommended for patients with a BMI equal to or **greater than 30** or BMI **greater than 27** when associated with comorbidities such as hypertension, diabetes mellitus, etc. Efficacy is assessed after 3 months of treatment.

### 4. Bariatric surgery

It is suitable for patients with a BMI equal to or **greater than 40** or a BMI **greater than 35** in the presence of comorbidities. For these patients, it is of the utmost importance to wait 12 months post-surgery before trying to conceive.

# EGG DONOR selection

Nuria Santamaría

Embryologist - UR HLA Mediterráneo  
Almería

## Requirements, testing, screening, limitations

Advances in assisted reproductive technology and the availability of gamete (egg and sperm) donors have given women and couples having difficulty conceiving naturally the chance to become parents.

THE NEED FOR DONORS COMES INTO PLAY IN SITUATIONS WHERE THERE ARE GENETIC OR HEREDITARY PROBLEMS AT PLAY, RECURRENT FAILURE OF IN VITRO FERTILISATION (IVF), CHROMOSOMAL ABNORMALITIES.

Furthermore, when it comes to eggs, some women cannot use their own gametes to conceive due to a number of medical or biological reasons such as diminished ovarian reserve, early menopause or ovarian absence.

Donor requirements are in place to ensure the safety and well-being of donor and recipient alike. This article will take an in-depth look at these requirements, tests, analyses, limitations, as well as how the right donors are chosen, what data can be made available and how to achieve the maximum physical resemblance.

**Confidentiality and anonymity** are protected in Spain for donors and recipients alike. Furthermore,

donors are financially compensated for their contribution.

### What requirements must donors comply with and who decides?

In Spain, gamete donation is governed by **Law 14/2006** on Assisted Reproduction Techniques and Royal Decree-Law 412/1996.

These laws set forth the requirements to be met by aspiring donors as well as the minimum number of tests to be performed by the reproduction clinics before accepting them as donors.

Donors must be **over 18**. Furthermore, with a view to avoiding age-related genetic damage to gametes, the maximum age for egg donors is set at **35** for egg donors and **50** for sperm donors.

Similarly, applicants must have full decision-making capacity and be in **good psychophysical health**, for which minimum study protocols are put in place and performed on all donors.

Finally, it should be noted that a register of donations was set up in Spain a few years ago through the platform known as **SIRHA**. All data concerning donors, recipients and treatment data are recorded on this platform, thereby guaranteeing the traceability of all processes.

### What tests are performed on donors?

The first stage is for donors to be **interviewed by the medical team**. During this interview, they are asked questions with a view to recording and analysing each patient's clinical conditions and family history. This study must con-

clude that they do not suffer from genetic, hereditary or infectious diseases that could be passed on to offspring. In this regard, a **family tree** is created that looks into three generations of the donor's family, asking questions about each family member to rule out genetically transmissible diseases as well as performing a number of analyses to rule out diseases.

Finally, the donor's **phenotypic traits** must be recorded (eye colour, hair colour, height, weight, blood group and Rh ...). These are the physical characteristics that will subsequently be used to match donors who most closely resemble each of the gamete recipients.

A psychological interview is also conducted to assess the donor's **psychological state**, on the one hand, to ensure that he/she does not suffer from any known psychological disorder, but also to prevent the gamete donation process from causing psychological damage during the process or further down the line.

### What tests are performed and what diseases are ruled out?

Different tests must be conducted to weigh up whether a donor is suitable or unsuitable. On the one hand, they are tested for infectious



diseases, such as **HIV, hepatitis B and C and syphilis**. In the case of sperm donors, this analysis includes chlamydia and gonococcus tests and, in the case of egg donors, it includes a complete blood count and coagulation tests to rule out any problems or coagulopathy that could occur during the ovarian puncture process.

In the case of sperm donors, these analyses also include a complete **semen analysis** to evaluate different parameters of the semen sample (concentration, morphology or motility) and a freeze/thaw test to assess the suitability of the semen sample.

All gamete donors are screened for **recessive disorders**. Recessive disorders are those of genetic origin in which both inherited copies of a gene contain a mutation.

In other words, we all carry at least **3-5 mutated genes** that we have inherited from our parents. The fact that we have these mutations does not mean we have a disorder, as we have only inherited the altered maternal or paternal copy. In these cases we are said to be **“healthy carriers”** for a particular disease. However, if instead of inheriting a single copy, we were to inherit both the altered maternal and paternal copy, then we would be affected, and therefore suffer from the disorder.

By performing this test on donors, we can ascertain whether they are carriers of mutations for certain diseases which allows us to perform a **“genetic compatibility”** study with the recipients, with a view minimising the risk of passing on two copies of the same mutation and therefore the disease.

In these cases, scientific societies recommend testing for certain diseases with a higher incidence in the population, however, these recommendations are not static; they might change over time depending on how knowledge about them develops. Diseases currently being tested for include cystic fibrosis, spinal muscular atrophy, non-syn-

dromic sensorineural deafness and haemoglobinopathies. Egg donors are tested for **Fragile X syndrome** and some X-linked diseases.

### What are the limitations of donation?

As mentioned above, donation processes strictly comply with regulatory law. In this regard, bear in mind that donation is anonymous and, therefore, **the identity of donors cannot be revealed**. However, the law does state that recipients and descendants alike may be given information on certain donor traits as long as anonymity is not compromised.

The number of donations that can be made is also regulated by law; in Spain, the person must not have produced more than 6 children born alive.

### What donor information can be made known?

Since donating in Spain is anonymous, it is up to the medical team to make the decision as to which donor is the most suitable for each recipient, with a view to selecting based on traits. The donors selected must have the **highest phenotypic similarity** to the recipient. Once the treatment is completed, to again prevent trait selection, re-

cipients can be told general donor traits, as long as their anonymity is not compromised.

### If the donor provides the “genetics” how is resemblance achieved?

The genetic makeup in each and every one of us determines some of our features and traits, but **it does not determine our tastes, the way we think or behave**. These traits, which ultimately define a human being, are mostly learned and linked to how we are brought up and therefore are down to the relationship between parents and chil-

dren and not genetic origin. On the other hand, a number of studies have shown that the uterine environment of the pregnant mother can influence the **foetal epigenetic** programming, in other words, the expression of certain genes.

Finally, in terms of physical resemblance, nowadays there are tools such as **Fenomatch** to help embryologists better select donors to be matched with a patient or couple. In this case, artificial intelligence compares the biometric data of the patient and the donor, objectively looking at a range of similarities, with a view to selecting with greater objectivity and achieving a greater resemblance in terms of physical traits.

Donating is an **act of huge generosity and solidarity**; giving other women and couples the chance to fulfil their longed-for dream to become parents. Furthermore, this generosity plays a big part in helping couples overcome the emotionally challenging experience of infertility by tackling the situation with greater optimism.

It is of the utmost importance to recognise the value of this altruistic work of gamete donors and the key role they play in the fertility process, which has a priceless impact on the recipients' lives, positively changing the course of their lives and giving them the chance to experience the miracle of conception and parenthood.

## ANALYSES FOR GENETIC STUDIES

On the one hand, the **karyotype**, which will show the number of chromosomes contained in the cells of the potential donor and how they are organised. This helps us to rule out donors who could be carriers of a chromosomal abnormality which, if not analysed, could be passed on to the offspring.

Some diseases transmitted in this way are **Klinefelter syndrome** or **Turner's syndrome**, altering the number of sex chromosomes (X and Y).

### In short:

REQUIREMENTS	TESTS	SCREENING	LIMITATIONS
18 - 35 years old For egg donors	Interview by the medical team	Infectious diseases (HIV, hepatitis B and C, syphilis)	Anonymous act
- 50 years old For sperm donors	Creating a family tree	Blood count	May be given some information
Have full decision-making capacity	Recording phenotypic traits	Karyotype	The medical team decide which donor is the most suitable for each recipient
Good psychophysical health	Psychological interview	Screening for recessive disorders	In Spain, the person must not have produced more than 6 children born alive

# Decreasing SPERM QUALITY in recent years

Marina Terol  
Embryologist - UR IMED Valencia

Historically speaking, male reproductive health is a field that couples that have had difficulty conceiving have underestimated.

Until quite recently, the focus has been primarily on women. However, there has been a paradigm shift therefore men are taking on an increasingly important role.

This transition has brought about new diagnostic techniques in clinical practice. Without doubt, it is a **public health issue** that has sparked considerable debate among professionals because of how important it is; not just with regard to morbidity and fertility success rates, but also in terms of the social and economic burden it entails for patients undergoing these techniques.

Within the context of a fertility consultation, a **sperm test or spermiogram** is the first test to be performed as part of the process of diagnosing male infertility. This test analyses a number of macroscopic parameters, such as volume, viscosity, liquefaction, colour and pH, not to mention microscopic parameters such as concentration, motility, vitality, morphology and the presence of leukocytes or other cells. Due to the high variability in results, **at least two spermiograms** are performed before a diagnosis is made. The World Health Organisation (WHO) sets reference standards for these tests, based on statistical criteria that are routinely used in diagnostic laboratories. If a sample does not meet these criteria, it is considered not to be **normozoospermic**, in other words, it is not within the normality parameters. Over the years, the WHO has published a number of manuals that have lowered the limits of these reference standards in line with the decrease in semen quality in the general population.

This decrease in semen quality can be attributed to a number of factors, however, its individual correlation in humans cannot be conclusively demonstrated, as it is not possible to look at isolated factors that could affect semen quality.

Firstly, **men's lifestyles** play a significant role. **Alcohol and tobacco** consumption are not the only things that affect sperm quality; **diet** plays a big role too. The prevalence of obesity has risen in recent decades, and a lot more men are overweight today than forty years ago. **Obesity and being overweight** have been shown to negatively affect semen quality, reducing sperm concentration and motility.

Furthermore, factors such as **psychological stress**, widespread in today's society, can also have a detrimental impact on sperm quality. In fact, a male fac-

tor diagnosis can create even more stress for men due to the stigmatisation that comes with male fertility, making couples who are unable to conceive even more stressed.

Another factor to bear in mind, which unfortunately cannot be completely eliminated in most cases, are chemicals known as **endocrine disruptors**. These substances can disrupt the body's hormonal system and bring about abnormalities in male reproductive function. These substances are found in **pesticides, medicines, hygiene products** and other chemicals through oral and dermal exposure alike. The presence of these toxics in the environment is on the rise all over the world due to the industrialisation of most processes, among other reasons.

When couples are actively trying to conceive, leading a **healthy lifestyle**, avoiding the consumption of toxic substances and watching what they eat and drink are of the utmost importance. A diet rich in fruits, vegetables, legumes and fish, foods containing antioxidants and polyunsaturated fats such as omega-3, should be followed. Consumption of processed meats and dairy products rich in saturated fats should also be kept to a minimum. A balanced diet goes hand in hand with **regular physical activity** to avoid leading a sedentary lifestyles and becoming overweight.

If any abnormal spermiogram parameters are identified, a consultation with an **andrology specialist** is recommended, because there are **dietary supplements** that can improve sperm quality.

Lastly, if a woman still cannot get pregnant after a year of actively trying, a **reproductive specialist** should be consulted. This professional will set out guidelines to follow with a view to fulfilling the ultimate goal: **TO BRING HOME A HEALTHY BABY.**

# How does SEMEN QUALITY decrease in men who have been infected with COVID-19?

**Dr. Rocio Nuñez Calonge**  
*Scientific Coordinator Grupo UR Internacional*

WE COMPARED SEMEN ANALYSES OF 45 PATIENTS PRE AND POST MILD COVID-19 INFECTION.

We saw a significant, potentially long-term, decrease in sperm volume, sperm concentration, total and progressive motility and vitality post-infection. In the wake of the Covid-19 pandemic, and the multi-organ system damage of the SARS-CoV-2 virus,

research has been conducted on how the infection affects the reproductive system. A number of studies have shown that Covid-19 infection affects **58%** of the male population, therefore it has been suggested that males are more susceptible to the effects of SARS-CoV-2.

There are a number of theories that could explain the increased susceptibility of males to the virus, although perhaps the most widely accepted is the higher level of **androgens and ACE2** (angiotensin converting enzyme) **receptors** in the testicle, which is then considered a target organ for viral entry.

A number of studies demonstrate the impact of SARS-CoV-2 on the health of infected males when compared with fertile controls and the negative effect on semen parameters. Nevertheless, few studies have been conducted on the effect of men with a mild Covid-19 infection on semen samples from patients pre and post-infection, not to mention the long-term effect. Most studies state that, if the virus **affects the testicles** and, in turn, sperm production, after a cycle of spermatogenesis (sperm formation), lasting approximately 70 days, seminal parameters will go back to normal.

The results of this study have been presented at the 39th Congress of the ESRHE (Society of Reproduction and Embryology), held in Copenhagen last June, and at the XII Congress ASEBIR (Association for the Study of the Biology of Reproduction), held in November in Palma de Mallorca". In our work we compare the semen analyzes of 45 patients, carried out before and after having suffered a mild Covid-19 infection.

The patients that took part in the study had come to the assisted reproduction clinics to be tested for infertility. Patients were aged **between 18 and 45**, and no age-related differences in semen parameters were observed. Sperm volume, sperm concentration, motility (total and active), morphology and vitality were analysed in pre- and post-infection analyses in each patient. The Covid-19 test

was performed between **17 and 516 days post-infection**. The median time between the two samples was **238 days**.

A significant decrease in sperm volume, sperm concentration, total and progressive motility and vitality was found after SARS-CoV-2 infection compared to pre-infection values. There was no significant change in morphology. Total sperm concentration underwent the most significant change, decreasing by a **median of 39%**. 50% of participants had a total count in the second sample that was **57% lower** than the pre-infection sample.

The study also sought to ascertain whether this decrease in semen quality was sustained over time or whether, when new sperm were produced, it went back to normal levels. Taking into account the duration of spermatogenesis, a cut-off point of **100 days** was set. Patients were split into two groups: those who performed semen analysis within 100 days of infection and those who performed semen analysis later. Values for sperm volume, sperm concentration, motility and vitality were subsequently compared between the two groups: those who performed the analysis in the first 100 days, and those who performed the analysis after that time. When comparing the results, **no differences were found** in any parameter between the two groups, therefore the effects of infection, in particular the decrease in sperm count and motility, were maintained with the same intensity 100 days post-infection.

These two findings; that semen quality is affected in men who have had a mild Covid-19 infection, and that these effects may be long-term, are of significant importance when it comes to male reproductive health. Although further studies are needed to gain a greater understanding of the mechanisms by which this damage is induced and persists over time, patients who have had Covid-19 should be tested, in particular those looking to start a family.

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Scientific Coordinator



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#### UR HLA VISTAHERMOSA

Hospital HLA Vistahermosa   
Avda. de Denia, 103, Alicante, 03015, España

+34 965 269 146   
+34 615 822 325

#### INTERNATIONAL DEPARTMENT

 Hospital HLA Vistahermosa  
Avda. de Denia, 103, Alicante, 03015, España

 +34 672 272 961

[www.grupointernacionalur.com](http://www.grupointernacionalur.com)  
[pacientes@grupointernacionalur.com](mailto:pacientes@grupointernacionalur.com)