

IN THE NAME OF GOD



Nutrition, Fertility and Infertility



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Agenda

- Definition
- Prevalence
- Etiology
- Risk factors
- Impact of infertility
- BMI & Fertility
- Insulin resistance & infertility
- PCOS , the most common cause of women's infertility and obesity fact
- Oxidative stress & infertility
- Endometriosis Nutrition
- A well-balanced diet or supplementation?
- Take home messages

What is the meaning of fertility?

Common synonyms of fertility:

- Ability to conceive
- Ability to have children
- Fecundity
- Potency
- Reproductiveness
- Productiveness

What is the meaning of fertility, fecundity and fecundability?

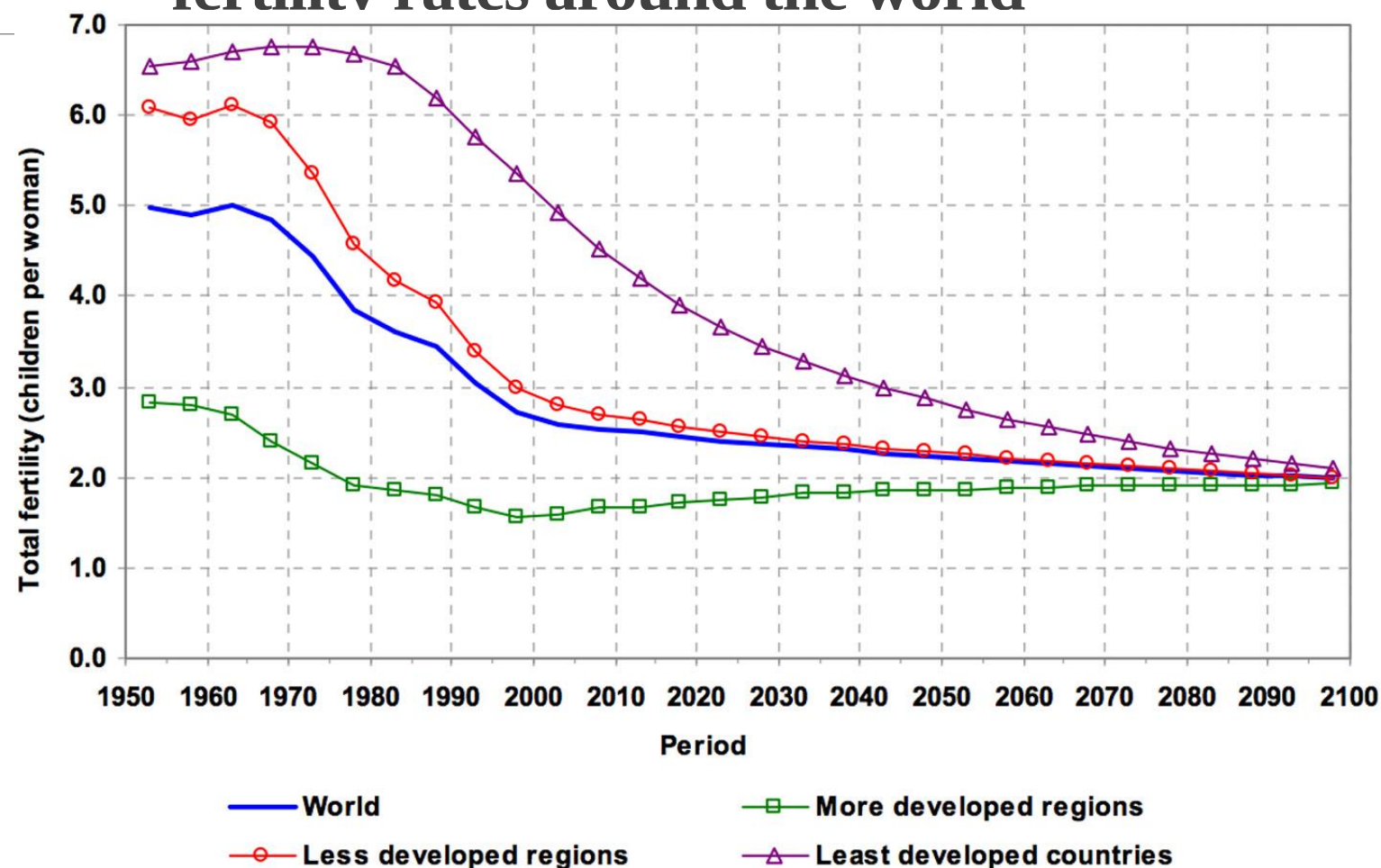
Fertility is the capacity to establish a clinical pregnancy.

Fecundity is clinically defined as the capacity to have a live birth.

Fecundability is the probability of a pregnancy, during a single menstrual cycle in a woman with adequate exposure to sperm and no contraception, culminating in a live birth.

- Fertility and infertility: Definition and epidemiology. Clinical Biochemistry 62 (2018) 2–10
- The international glossary on infertility and fertility care, 2017, Fertil. Steril. 108 (3) (2017) 393–406.

Fertility estimates (1950–2010) and projections (2010–2050) of fertility rates around the world



Major factors that may influence the spontaneous fertility of couples

The three major factors affecting the spontaneous probability of conception are:

1.

- Time of wanted non-conception

2.

- Female age related fertility decline

3.

- Disease-related infertility

-
- **80 %** of the pregnancies occur in the first six cycles with regular intercourse in the fertile period.
 - One out of two couples of the residual 20% couples without conception will conceive spontaneously in the next six cycles.
 - After 12 unsuccessful cycles, **10%** of the couples are defined as infertile but spontaneous live birth rates among them will reach nearly 55% in the next 36 months.
 - After 48 months, **5%** of the couples are definitively infertile with a nearly zero chance of becoming spontaneously pregnant.

What is infertility ?

- A disease characterized by the failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse or due to an impairment of a person's capacity to reproduce either as an individual or with his/her partner.
- Fertility interventions may be initiated in less than 1 year based on medical, sexual and reproductive history, age, physical findings and diagnostic testing.
- Infertility is a disease, which generates disability as an impairment of function.
- Infertility is further categorized as primary or secondary.

- Fertility and infertility: Definition and epidemiology. Clinical Biochemistry 62 (2020) 2–10
- The international glossary on infertility and fertility care, 2017, Fertil. Steril. 108 (3) (2017) 393–406.

Infertility Definition

The primary infertile female is a woman who has never been diagnosed with a clinical pregnancy and meets the criteria of being classified as having infertility.

Secondary female infertility applies to a woman unable to establish a clinical pregnancy but who has previously been diagnosed with a clinical pregnancy.

Secondary infertility is most common in regions of the world with high rates of unsafe abortion and poor maternity care, leading to post-abortive and postpartum infections

Infertility, subfertility and sterility: what are the differences?

While the definition of **infertility** relies on a restricted time period, **sterility** is a permanent state of infertility.

Subfertility is a term that could be used interchangeably with infertility.

Subfertility was also defined as any form or grade of reduced fertility in couples unsuccessfully trying to conceive.

- The international glossary on infertility and fertility care, 2017, Fertil. Steril. 108 (3) (2017) 393–406.
- Fertility and infertility: Definition and epidemiology. Clinical Biochemistry 62 (2018) 2–10

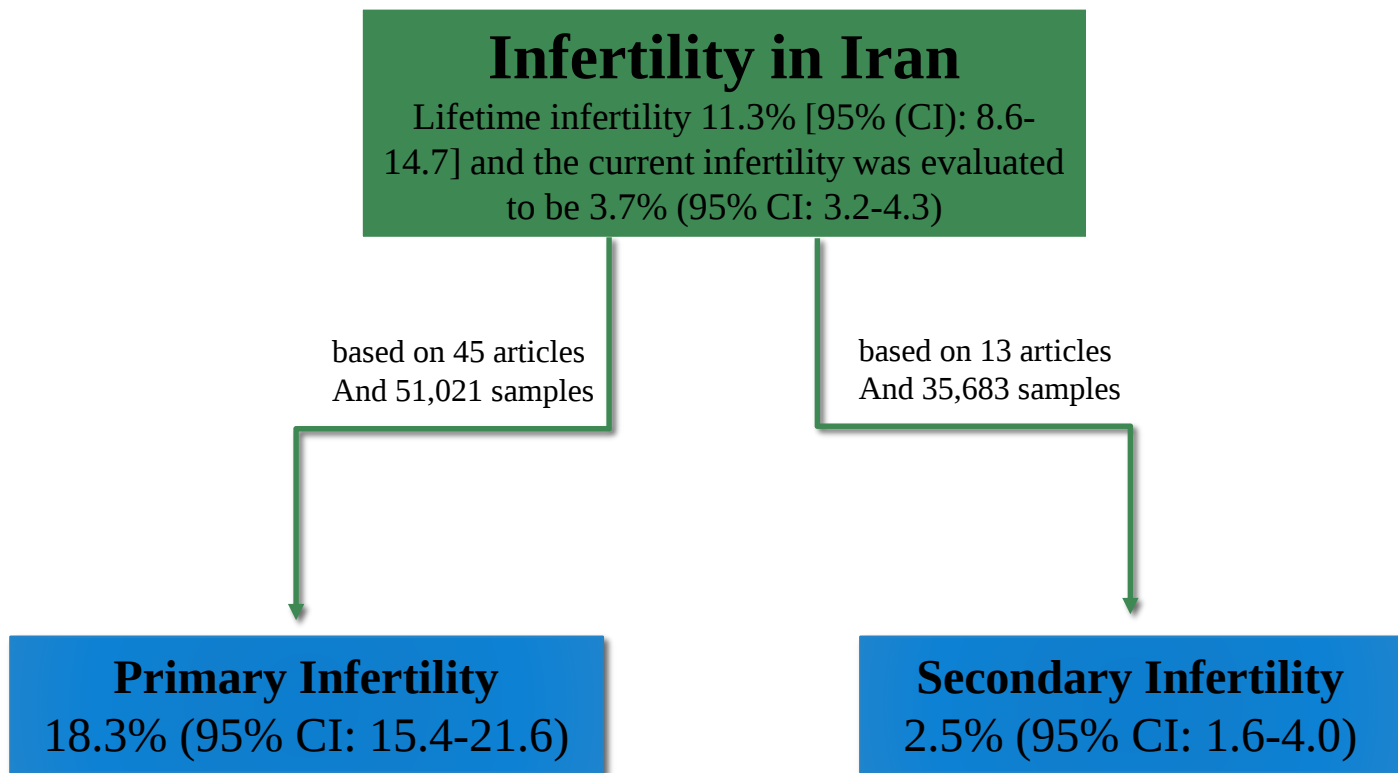


Prevalence of infertility

A Meta-Analysis of The Prevalence and Etiology of Infertility in Iran

Ghobad Abangah, M.D.¹, Tayebbeh Rashidian, M.D.², Marzieh Parizad Nasirkandy, M.D.^{3*}, Milad Azami, M.D.¹

- ✓ Infertility is a serious health issue in the world affecting approximately 8-10% of couples worldwide.



Main Causes of Infertility

- Female factors (~30–40%)
 - Ovulatory disorders
 - PCOS
 - Hypothalamic dysfunction (stress, underweight, excessive exercise)
 - Hyperprolactinemia
 - Thyroid dysfunction
 - Tubal and peritoneal factors
 - Prior pelvic inflammatory disease
 - Tuberculosis (in some regions)
 - Post-surgical adhesions
 - Peritoneal factors
 - Adhesions, pelvic inflammation
 - Uterine factors
 - Structural anomalies
 - Congenital uterine malformations (e.g., septate uterus)
 - Fibroids (submucous, intramural)
 - Adhesions (Asherman syndrome)
 - Endometrial pathology
 - Polyps, chronic endometritis
 - Endometriosis
 - Diminished ovarian reserve / POI
 - Other / systemic conditions (e.g., endocrine, autoimmune, metabolic)
- Male factors (~30–40%)
- Combined factors (~10–20%)
- Unexplained (~10–20%)
 - Normal standard evaluation but failure to conceive



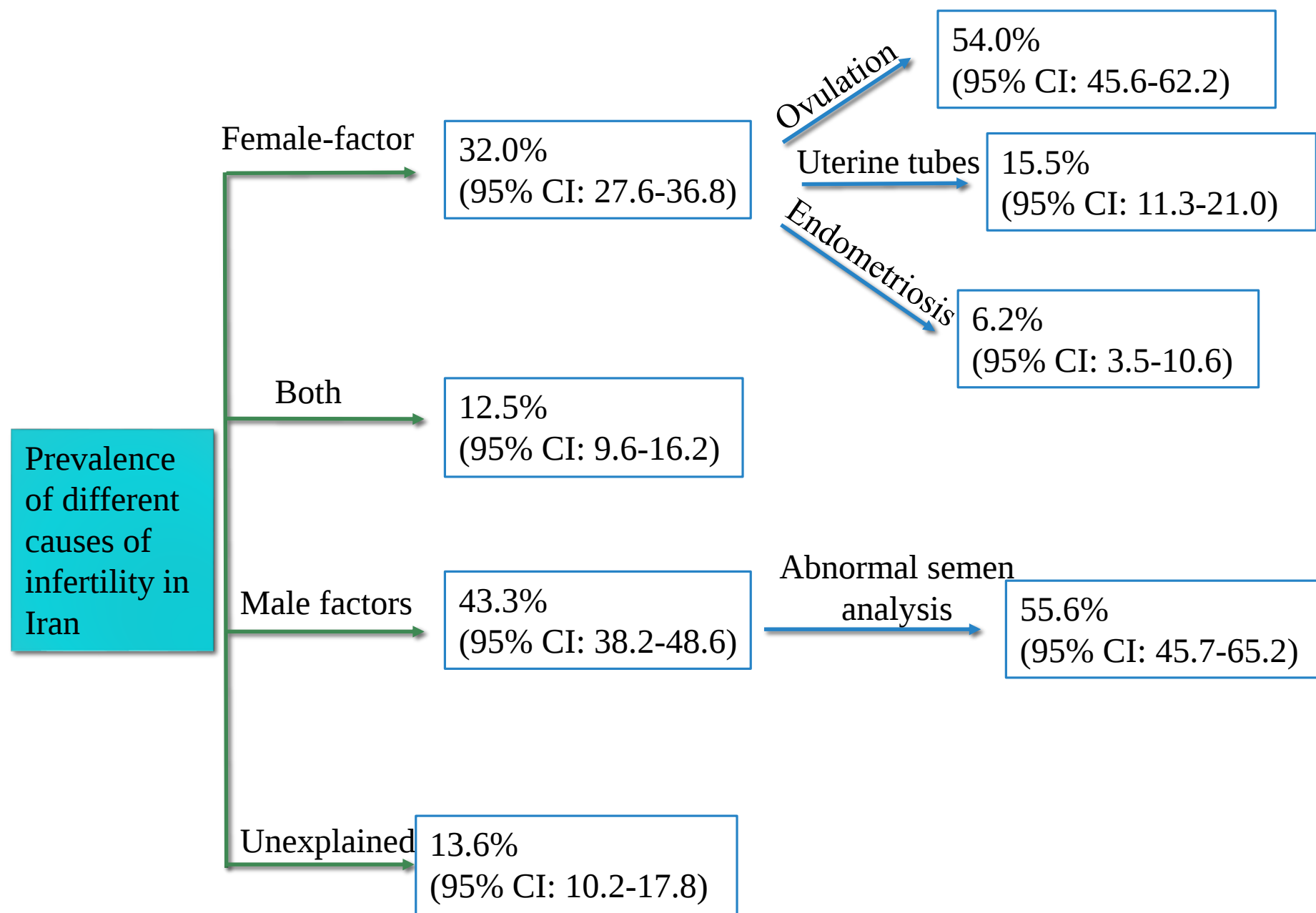
Male infertility

Males are found to be solely responsible for 20–30% of infertility cases but contribute to 50% of cases overall.

Infertility caused primarily by male factors encompassing:

- Abnormal semen parameters or function
- Anatomical, endocrine, genetic, functional or immunological abnormalities of the reproductive system
- Chronic illness
- Sexual conditions incompatible with the ability to deposit semen in vagina.

- It is now known that up to 90% of male infertility causes are down to low sperm count, low sperm quality, or both.
- Over the past 50 years, there has been an overall decrease in sperm concentration in men in Europe by 32%.
- Nutrition is one of the main factors directly related to sperm quality and that lifestyle is crucial in maintaining normal reproductive capacity.



Estimated that female infertility accounts for only 35% of all infertility cases, whereas about 20–30% of infertility cases are solely due to males, but generally male factors are identified as the main cause in 50% of infertility problems overall worldwide.

why infertility is an important disorder?

- ✓ Mental discomfort
- ✓ Social stigma
- ✓ Economic stress
- ✓ Marital separation
- ✓ According to the results comparing stressful life events, after mother's death, father's death and spouse's infidelity, infertility is ranked as fourth stressful life event

Infertility risk factors

- ❖ Emotional afflictions (interpersonal problems, marital discontent and loss of libido)
- ❖ Changes in women's role in social activities
- ❖ Delaying marriage
- ❖ Changes in childbearing age
- ❖ Increasing use of contraceptive methods
- ❖ Liberal abortion laws
- ❖ Undesirable economic status
- ❖ Obesity
- ❖ Nutrition
- ❖ Environmental factors

Female age related fertility decline

- The fertility decline already starts around 25–30 years of age.
- The median age at last birth for females is 40–41 years in most natural fertility populations.
- The continuous depletion of oocytes stored in both ovaries during fetal life, leading first to a decreased fertility and then to its subsequent expiration a decade later at the onset of menopause.
- Oocyte quality also deteriorates with advancing reproductive age besides premature recruitment of follicles, increasing ovulatory disorders, reduced ovulatory frequency and impaired luteal phase, all leading to reduced conception rates.

Why does nutrition matter for fertility?

- I. Recent evidences suggest that various components of diet and lifestyle may contribute to reducing the risk of fertility problems in the general population of reproductive age, and may also be an effective treatment for women and men already experiencing infertility.
- II. Nutritional advice can be crucial in treating infertility as there is strong evidence that healthy eating habits adopted before conception in both men and women of childbearing age have a beneficial effect on fertility.
- III. A well-planned nutrition can also translate into the effectiveness of ART.
- IV. A well-balanced plant-based diet with a low glycemic index, with the lowest possible proportion of processed foods, seems to have a positive effect on fertility, especially if planned by a dietitian and not deficient in minerals or vitamins.

The Association Between BMI and Infertility



nutrients



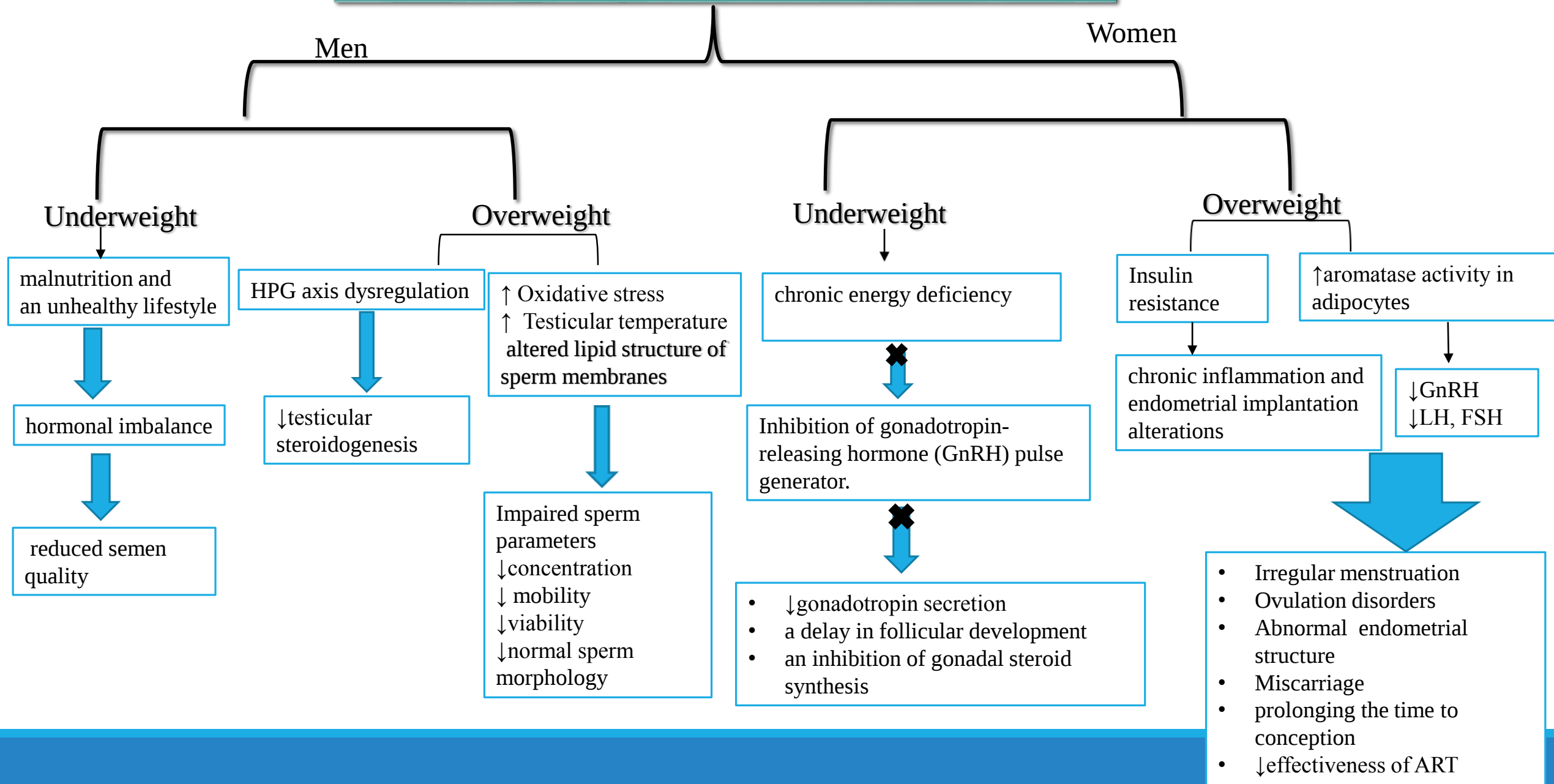
Review

The Influence of Metabolic Factors and Diet on Fertility

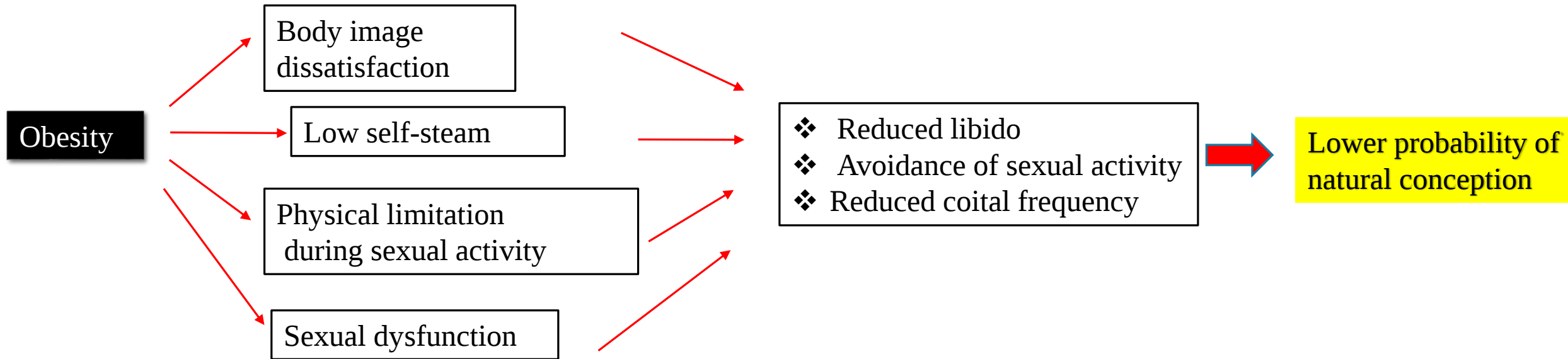
Klaudia Lakoma ^{1,2,*}, Olha Kukharuk ^{1,2} and Daniel Šliž ^{1,2,3} 

Many studies have looked at the effect of low BMI on reproductive ability. It has been shown that inadequate diets, whether low-calorie or unhealthy, excessive caloric intake, can disrupt the physiological reproductive function and greatly increase the risk of infertility

The Association Between BMI and Infertility

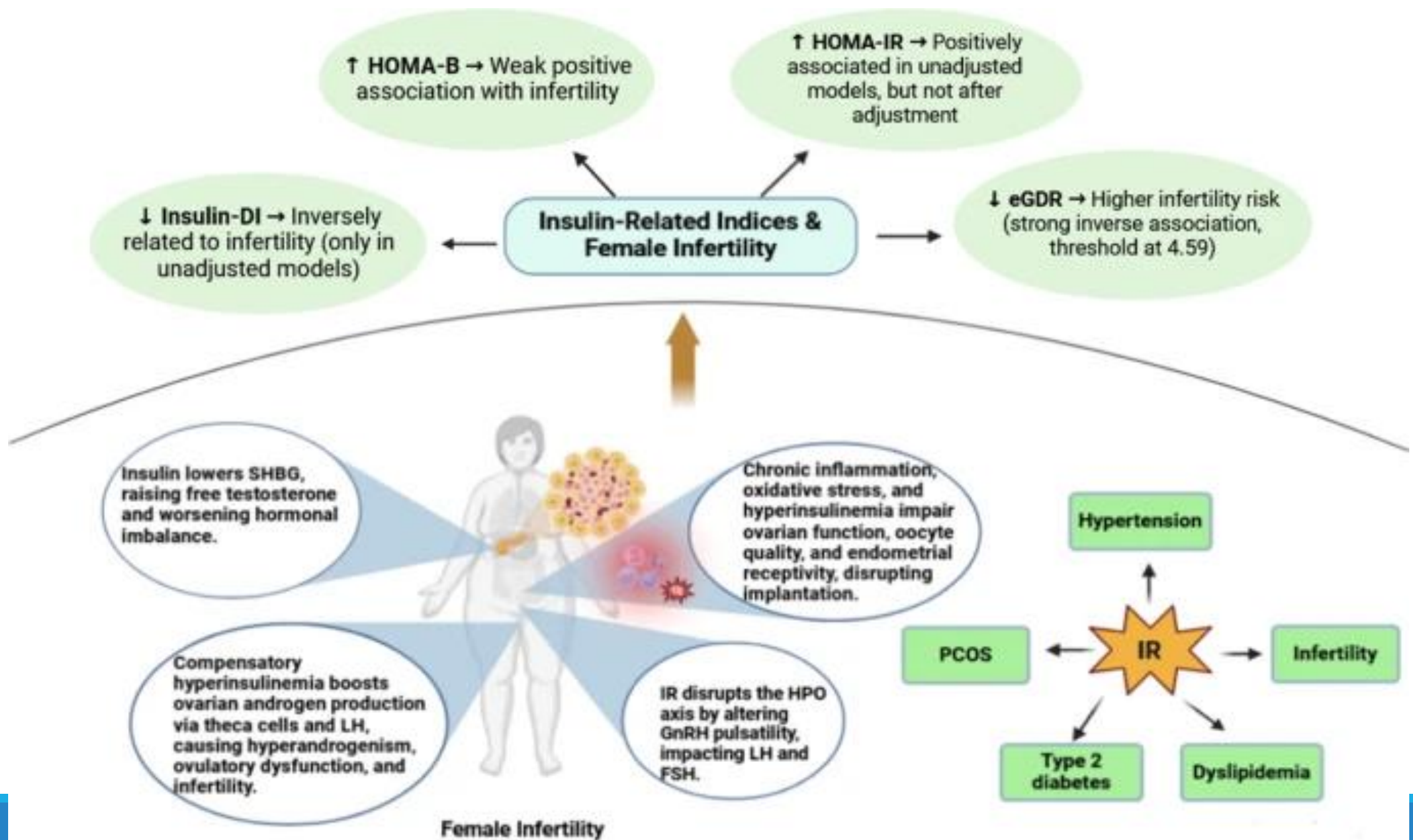


The Association Between BMI and Infertility



Insulin Resistance

- Insulin resistance and diabetes mellitus are related to the deterioration of fertility in women and men, mainly due to the generation of high oxidative stress, which is the main cause leading to an increased risk of infertility and hormonal disorders.
- Circulating markers of oxidative stress in women with PCOS have been shown to be abnormal regardless of the weight. It has been shown that there is a strong association between insulin resistance, hyperinsulinemia, and infertility in PCOS patients.
- The clinical pregnancy rate and the miscarriage rate has been shown to be higher when the male partner is diabetic.



Diagnostic criteria for PMOS(previously PCOS)

Rotterdam consensus is now firmly grounded in best evidence

International Guideline Diagnostic Criteria 2023

International Guideline Criteria

Diagnostic criteria in adults requires two of:

1. Oligo- or anovulation;
2. Clinical and/or biochemical hyperandrogenism;
3. Polycystic ovaries or Anti -Mullerian Hormone levels

and exclusion of other aetiologies

Adolescent criteria

Adolescent diagnostic criteria requires:

1. Oligo- or anovulation; and
2. Clinical and/or biochemical hyperandrogenism;

and exclusion of other aetiologies

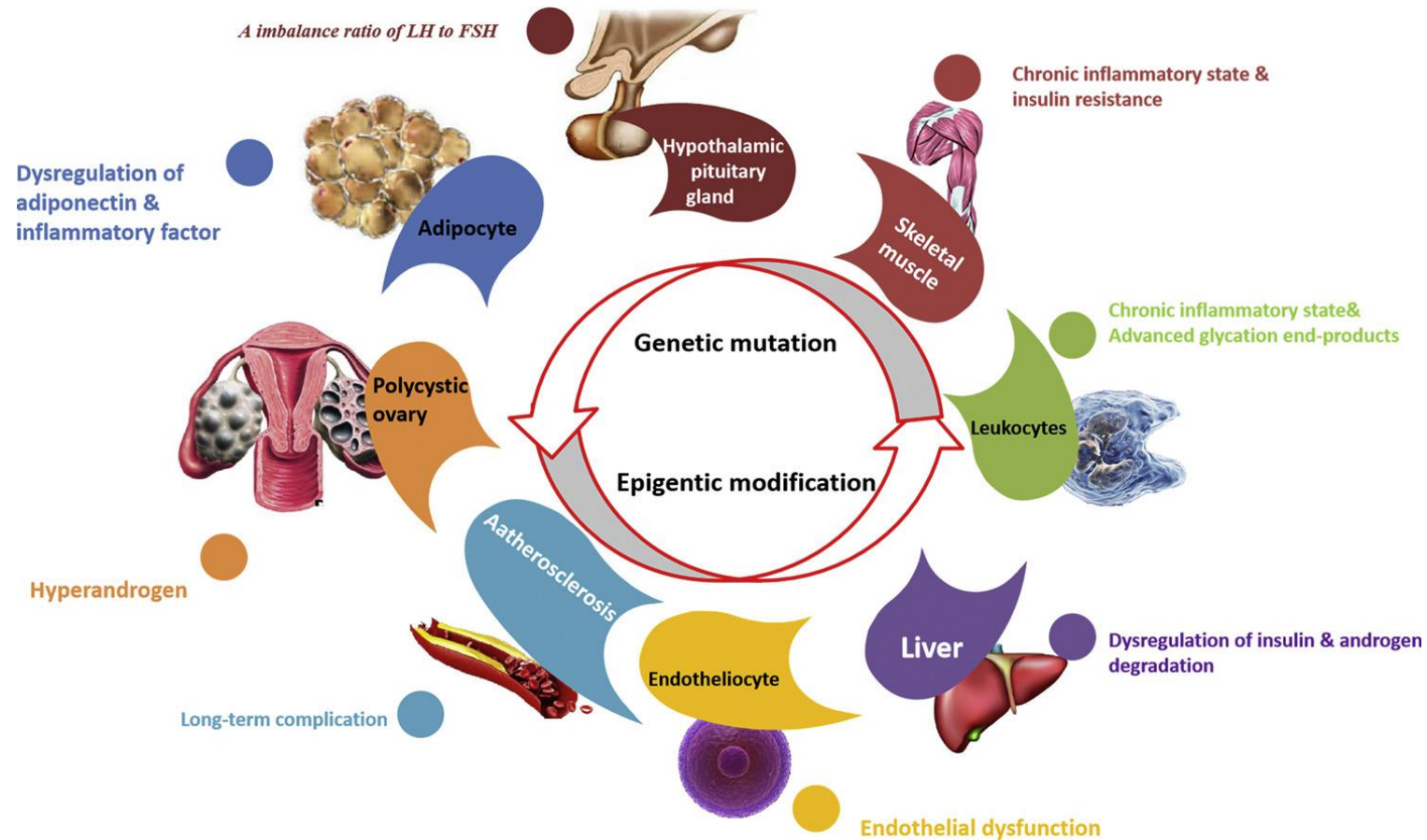
Rotterdam HR 2003

Teede et al Clin Endo, Fertil Steril, Human Reprod 2018,

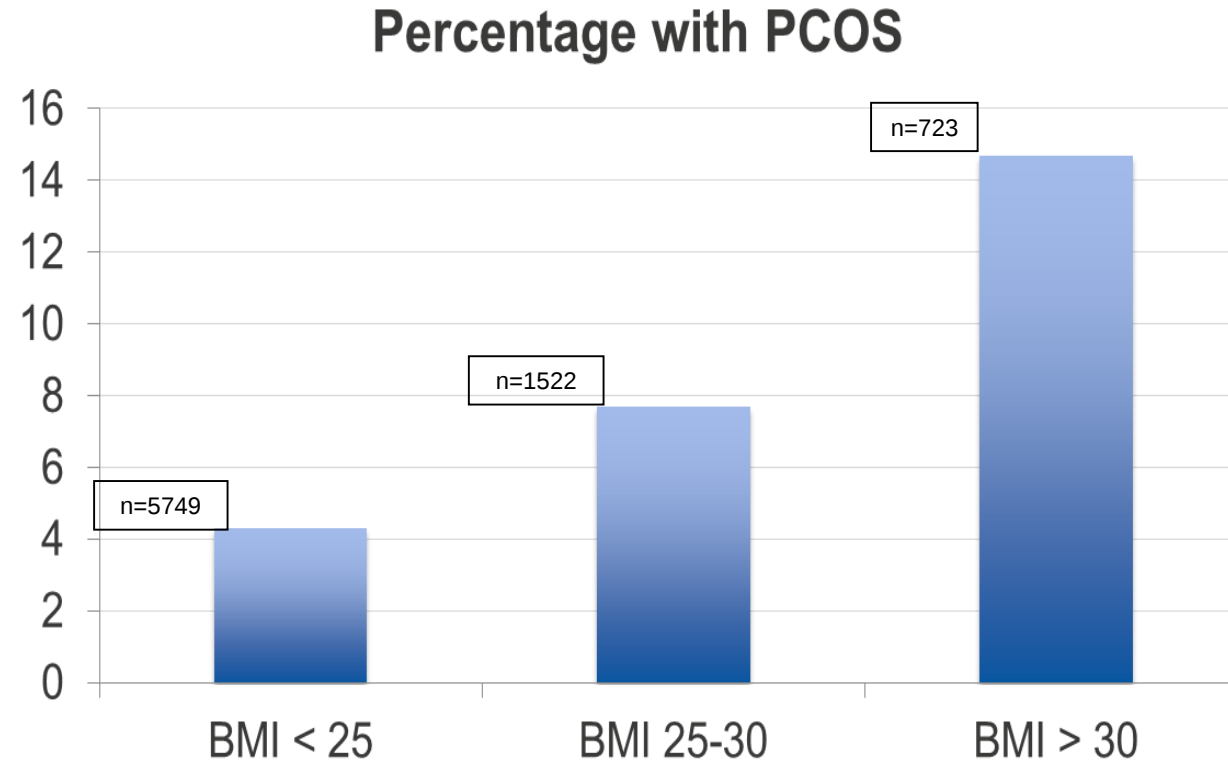
Teede et al JCEM, Fertil Steril, Human Reproduction and European J Endocrinology 2023



Pathophysiology of PMOS



PCOS, prevalence & BMI

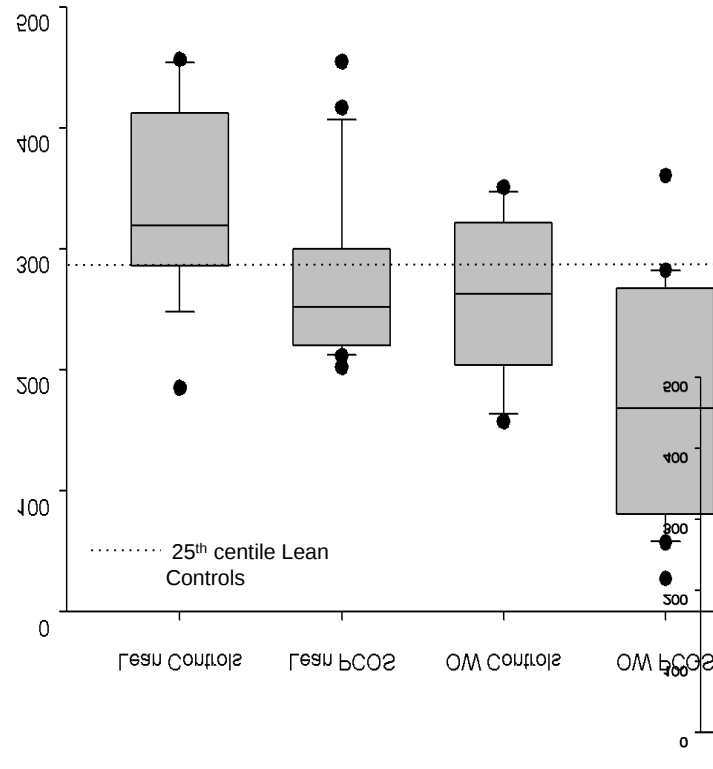


Significant linear trend PCOS prevalence ($p < 0.001$)
9% increased risk developing PCOS for every 1 unit inc in BMI

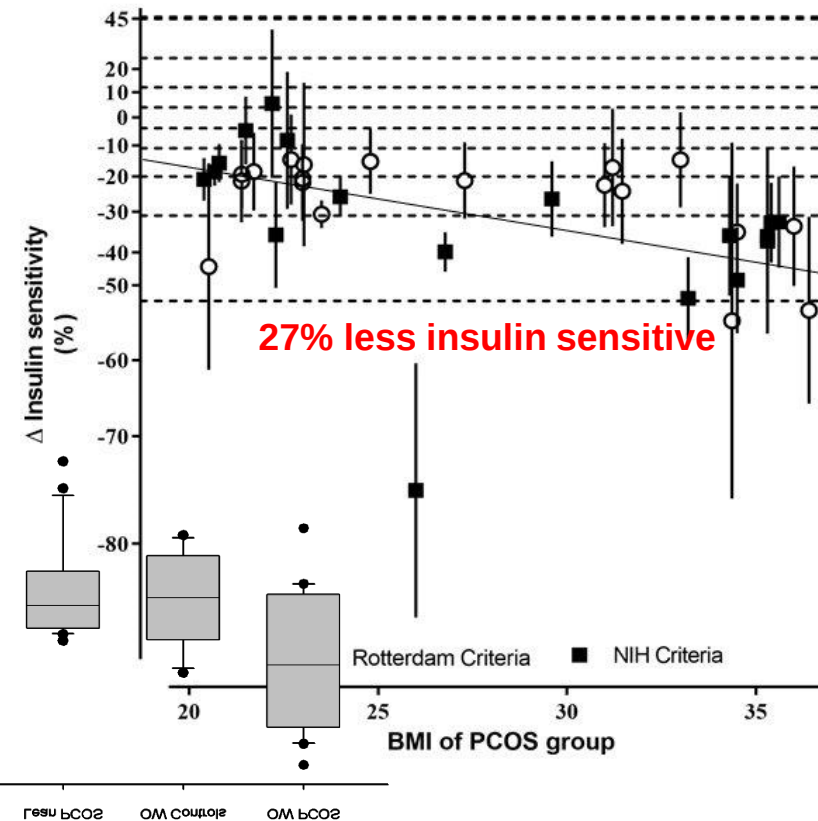
Teede, Obesity 2013



PCOS – insulin resistant condition



Stepto et al. Human Reproduction, 2013
doi:10.1093/humrep/des463



Cassar S et al. Hum. Reprod. 2016



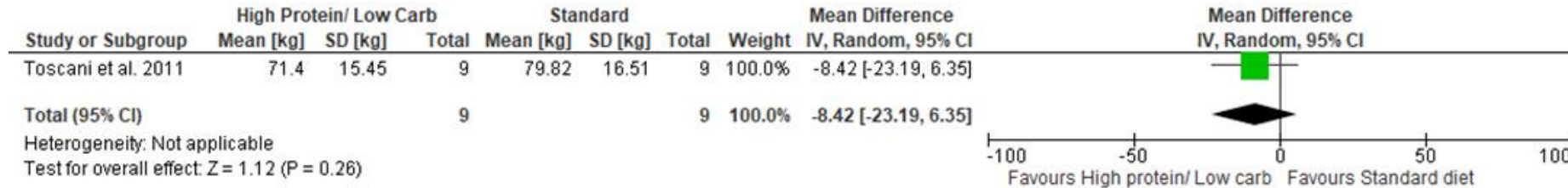
Lifestyle

- First line therapy
- Healthy lifestyle for excess weight gain prevention is important for all women with PCOS regardless of weight
- Higher weight – permission and if weight centric care; aim for 5-10% weight loss per 6 months

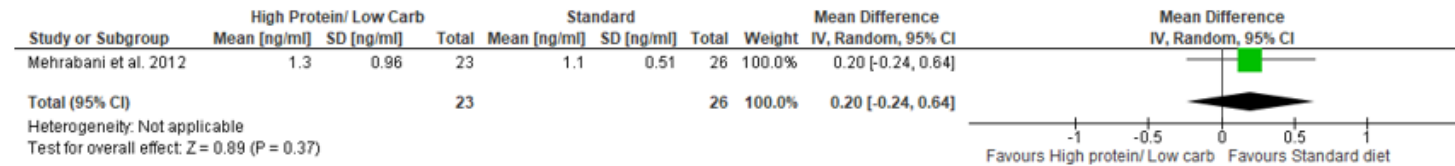


Dietary Intervention

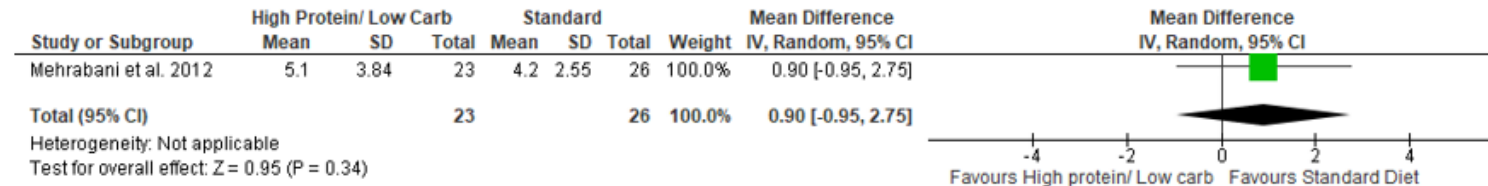
HIGH PROTEIN vs STANDARD DIET



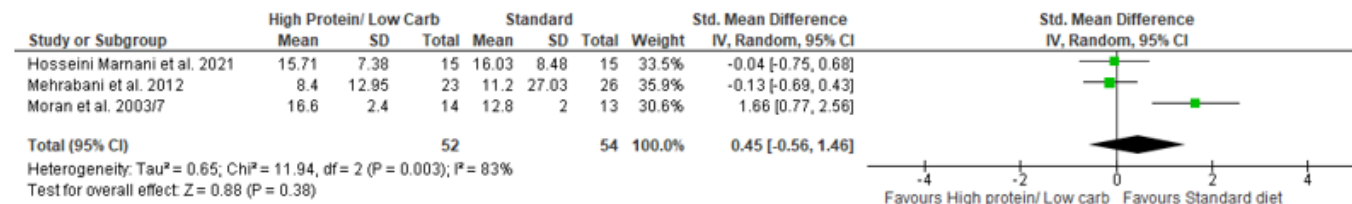
Total testosterone



Free androgen index



Fasting insulin (using SMD to account for variation in measures/ units)

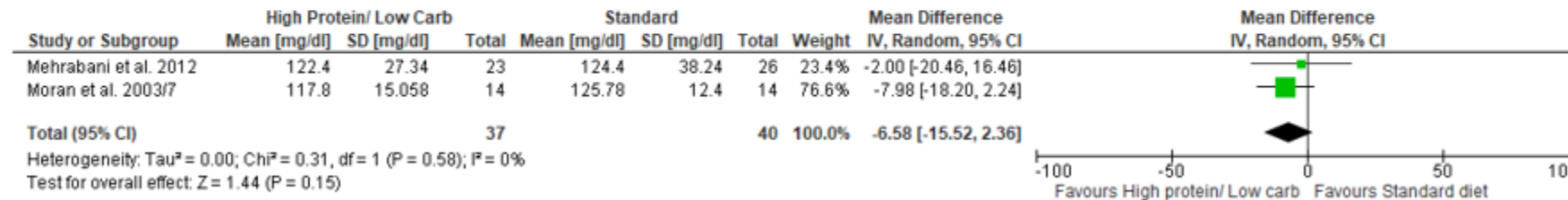


Dietary Intervention

LDL-C



Triglycerides



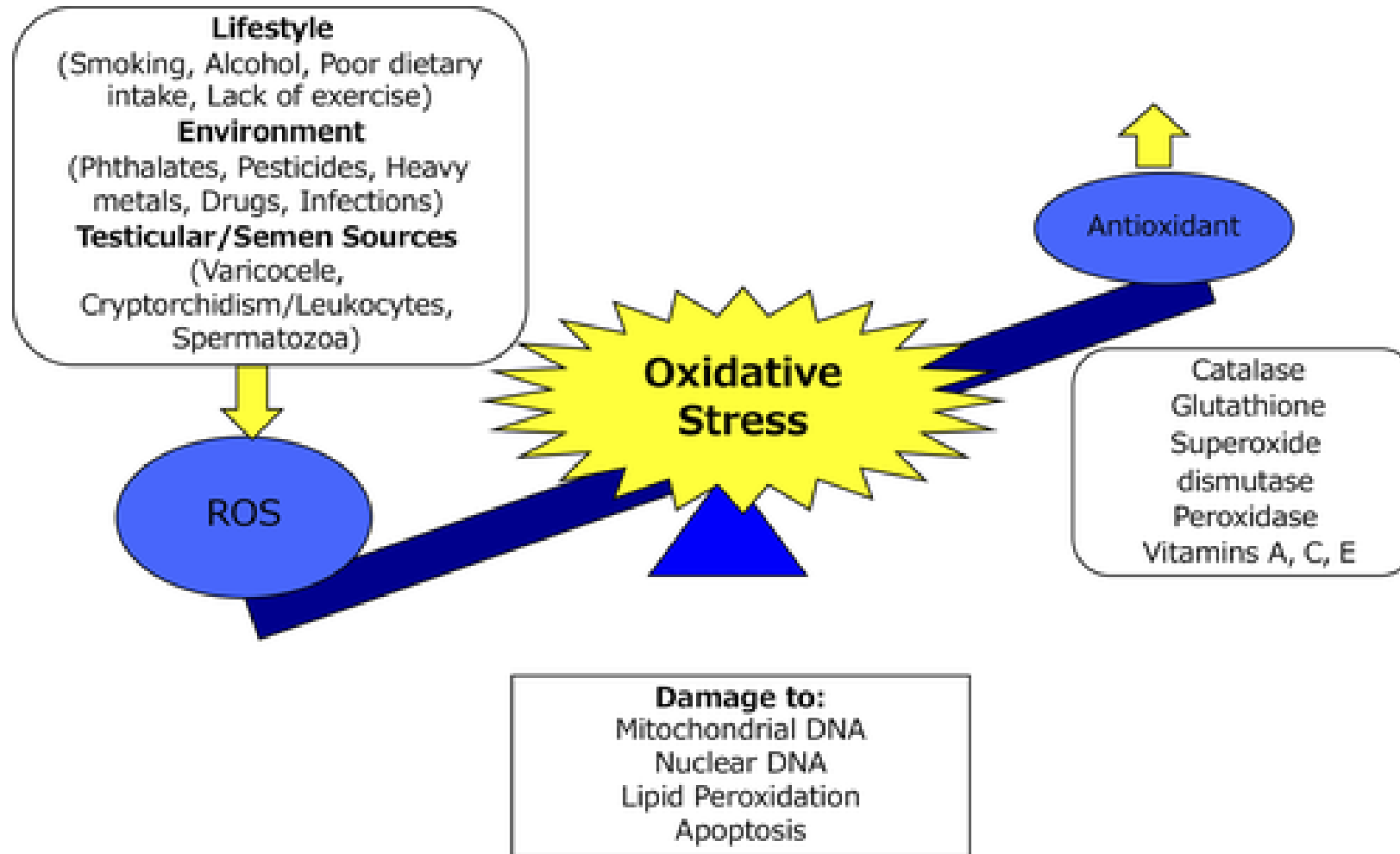
Nutrition and Infertility

- Latest researches provide solid evidence of the negative effects of **insulin resistance** and **oxidative stress** on a couple's fertility.
- Higher consumption of healthy plant food groups (especially whole grains, fruits, vegetables, tea and coffee) is correlated with lower risk of type 2 diabetes through various biological pathways such as weight management, anti-inflammatory effects, antioxidants and improvement of the gut microbiome through higher intake fiber and polyphenols, and lower saturated fat intake.

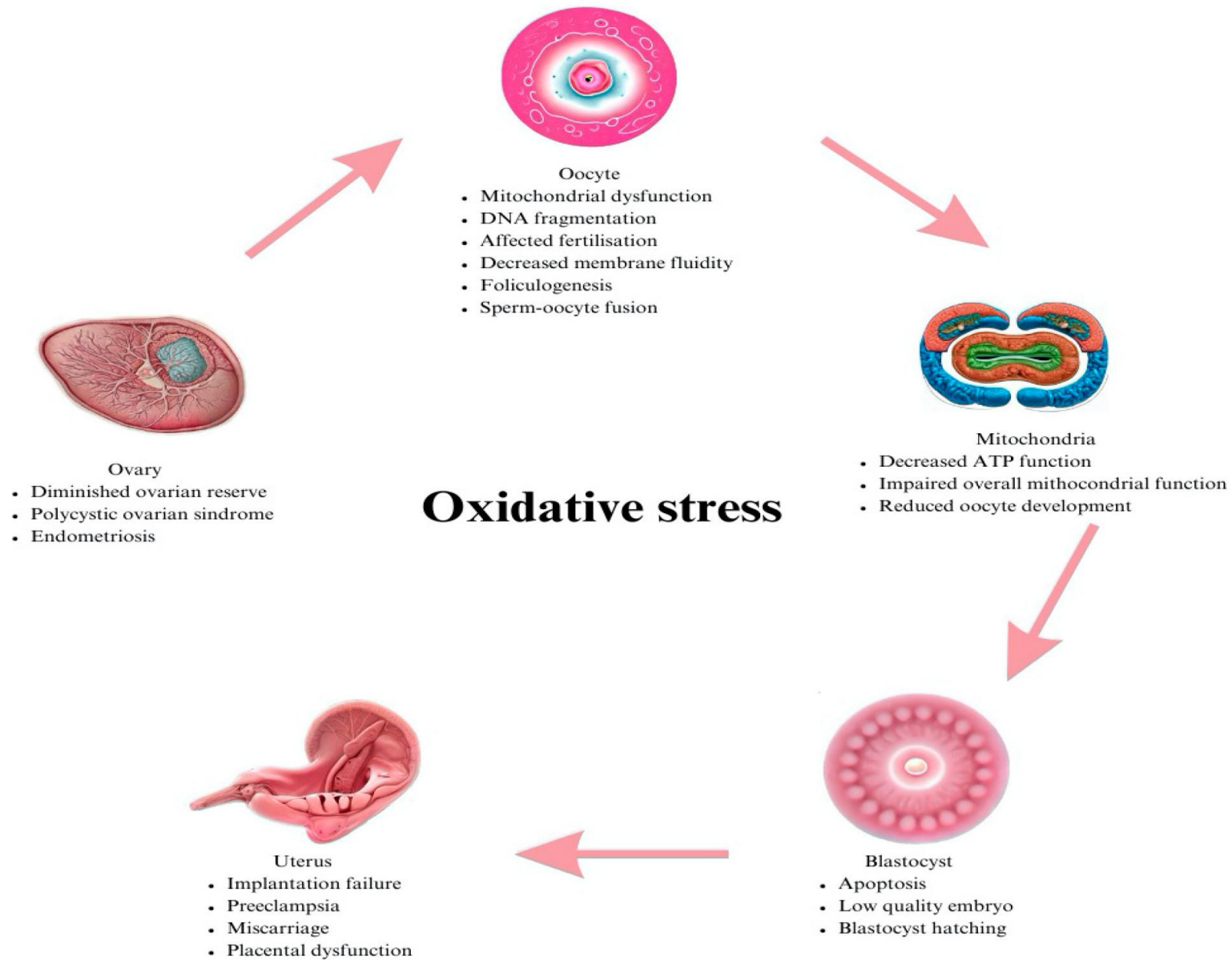
Oxidative Stress

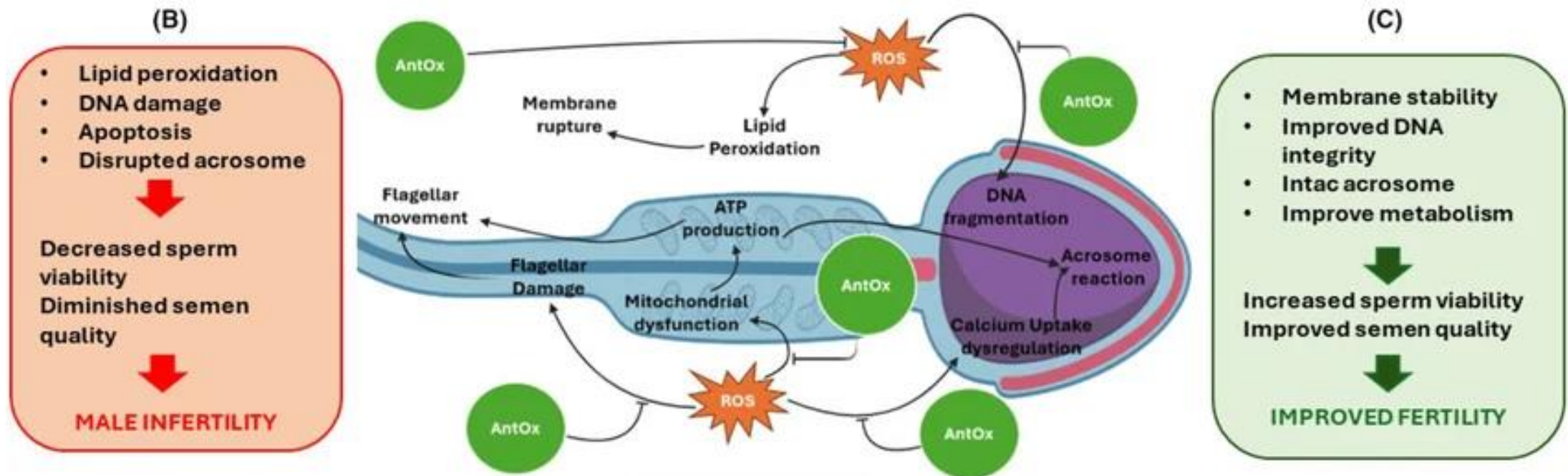
The occurrence of OS is caused by the overproduction of ROS. ROS play an important role not only as **secondary messengers in many cascades of intracellular signaling**, but interestingly, they also influence **pathological processes concerning the female genital organs, and in men they affect sperm production**.

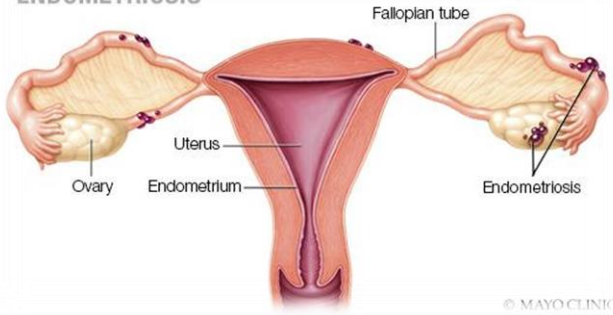
Superoxide dismutase (SOD) is one of the most significant antioxidant enzymes and is involved in the conversion of anionic superoxide (O_2^-) into hydrogen peroxide (H_2O_2). **SOD is believed to be involved in the development of oocytes and the ovulation process, since the activity of this enzyme has been found in developing follicles, graaf membranes, postovulatory follicles, and follicular fluid and ovaries.**



Imbalances between pro-oxidants and antioxidants could lead to a number of female and male reproductive diseases.







Endometriosis

Endometriosis is defined as a pathological pelvic inflammatory process that endometrial glands and stroma occur outside the uterine cavity; this disease is often associated with infertility.

The pathogenesis of endometriosis appears to be multifactorial, including ectopic endometrial tissue, altered immunity, imbalanced cell proliferation and apoptosis, aberrant endocrine signaling, and genetic factors.

Anatomical distortions related to endometriosis due to adhesions and fibrosis to endocrine abnormalities and immunological disturbances results in infertility.

Endometriosis is a chronic, hormone-dependent disorder characterized by an inflammatory response.

The disease affects approximately 10% of the general female population, with prevalence rates reaching 30–40% in women with dysmenorrhea and 50–60% in those experiencing infertility.

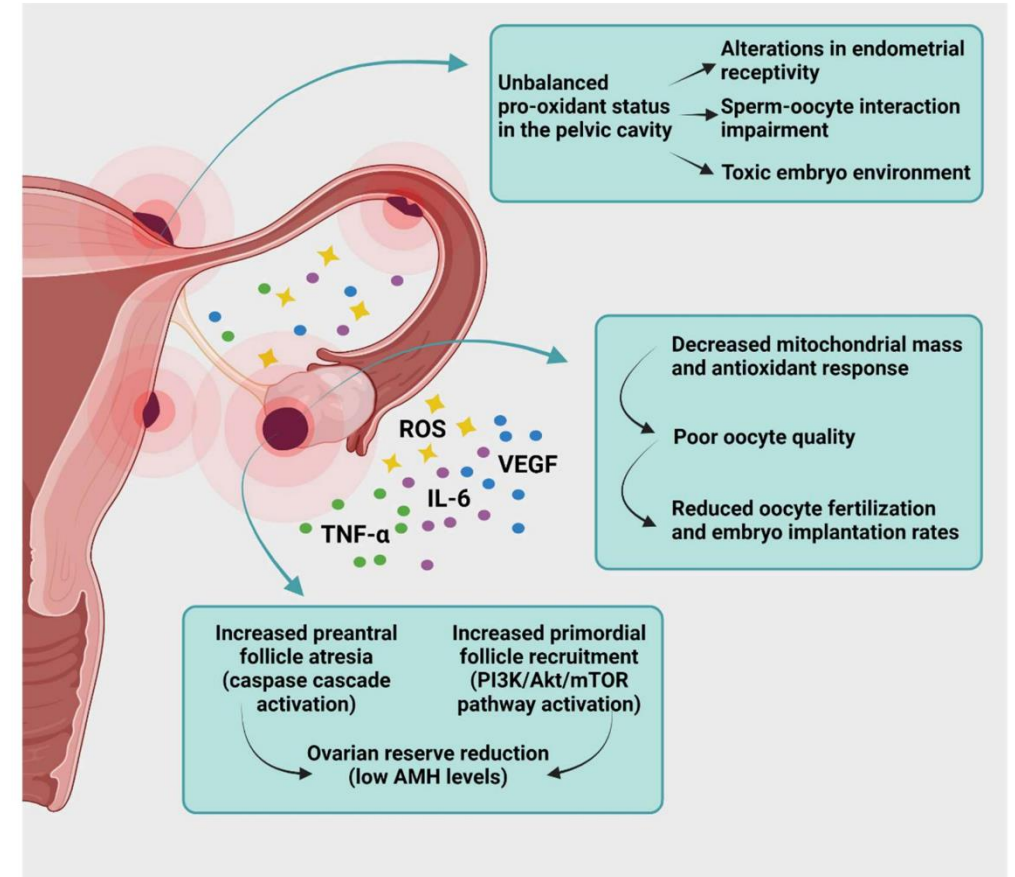
Some studies showed a higher prevalence of endometriosis among Asian women.

How does endometriosis affect ovarian reserve?

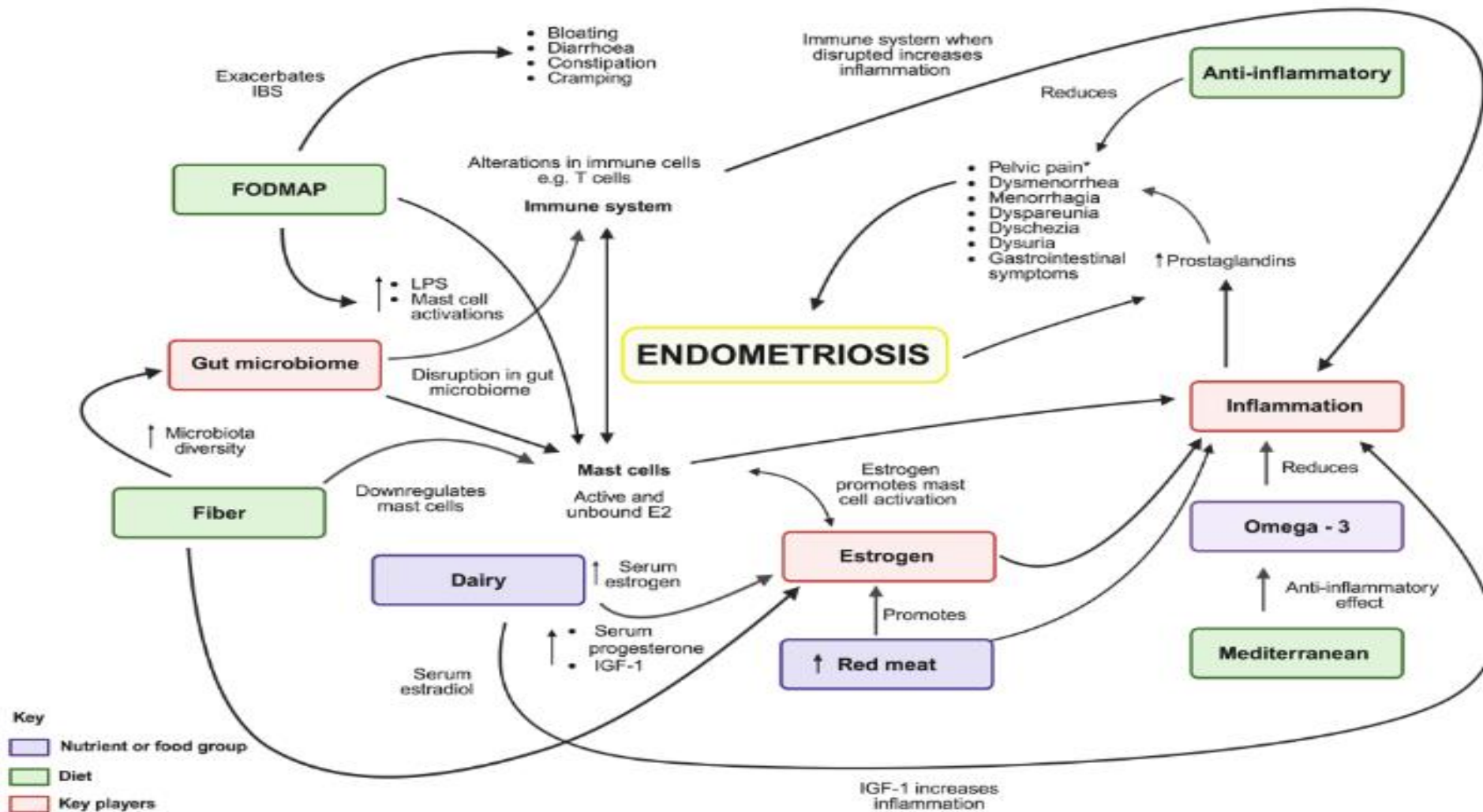
Compressing ovarian tissue, leading to follicle loss.

Creating an inflammatory environment that damages follicles

Iatrogenic (Surgical removal of endometriomas)



The role diet and nutrients play in the pathophysiology of endometriosis.



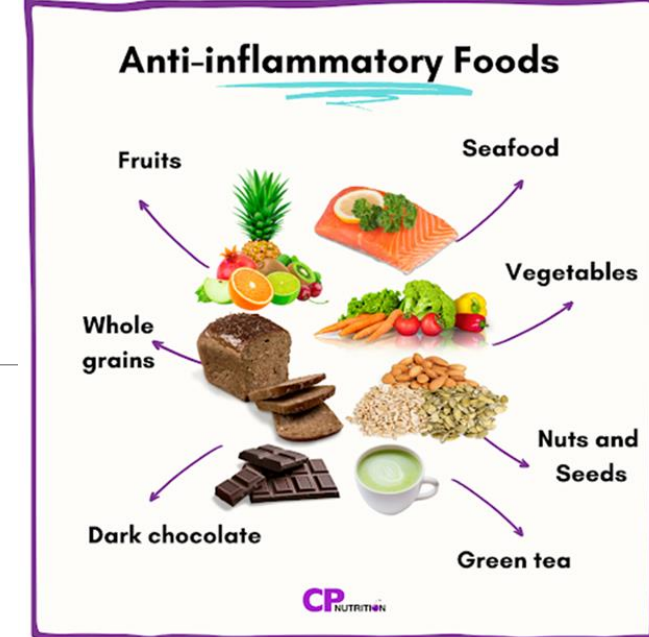
Nutrients role in the pathophysiology of endometriosis

- Diets, food groups, and single nutrients may influence pathophysiological processes underlying endometriosis, such as inflammation, estrogen pathways, and microbiome interactions.
- A high-fiber diet increases **microbiome diversity**, which leads to the **downregulation of MCs and inflammation**.
- A diverse microbiome **metabolizes circulating estrogen**.
- A high FODMAP diet increases IBS-like symptoms, such as bloating, which can further worsen the symptoms of endometriosis.
- High FODMAP increases **LPS and MC activation, increasing prostaglandins** and leading to pain.
- Red meat increases **inflammation as well as sex hormones and estrogen in the blood, influencing prostaglandins, increasing inflammation**, and therefore, pain.
- The Mediterranean diet, which is rich in **antioxidants and ω -3 FAs, reduces inflammation**, which has the potential to reduce prostaglandins, and endometriosis-related pain. The anti-inflammatory diet has the same influence.
- Dairy can increase **serum estrogen, progesterone, and IGF-1, all of which influence the levels of estrogen** in the blood, which can activate MCs, therefore worsening pain-related symptoms. Estrogen may cause and/or promote MC activation, leading to inflammation.

Review

Endometriosis and Nutrition: Therapeutic Perspectives

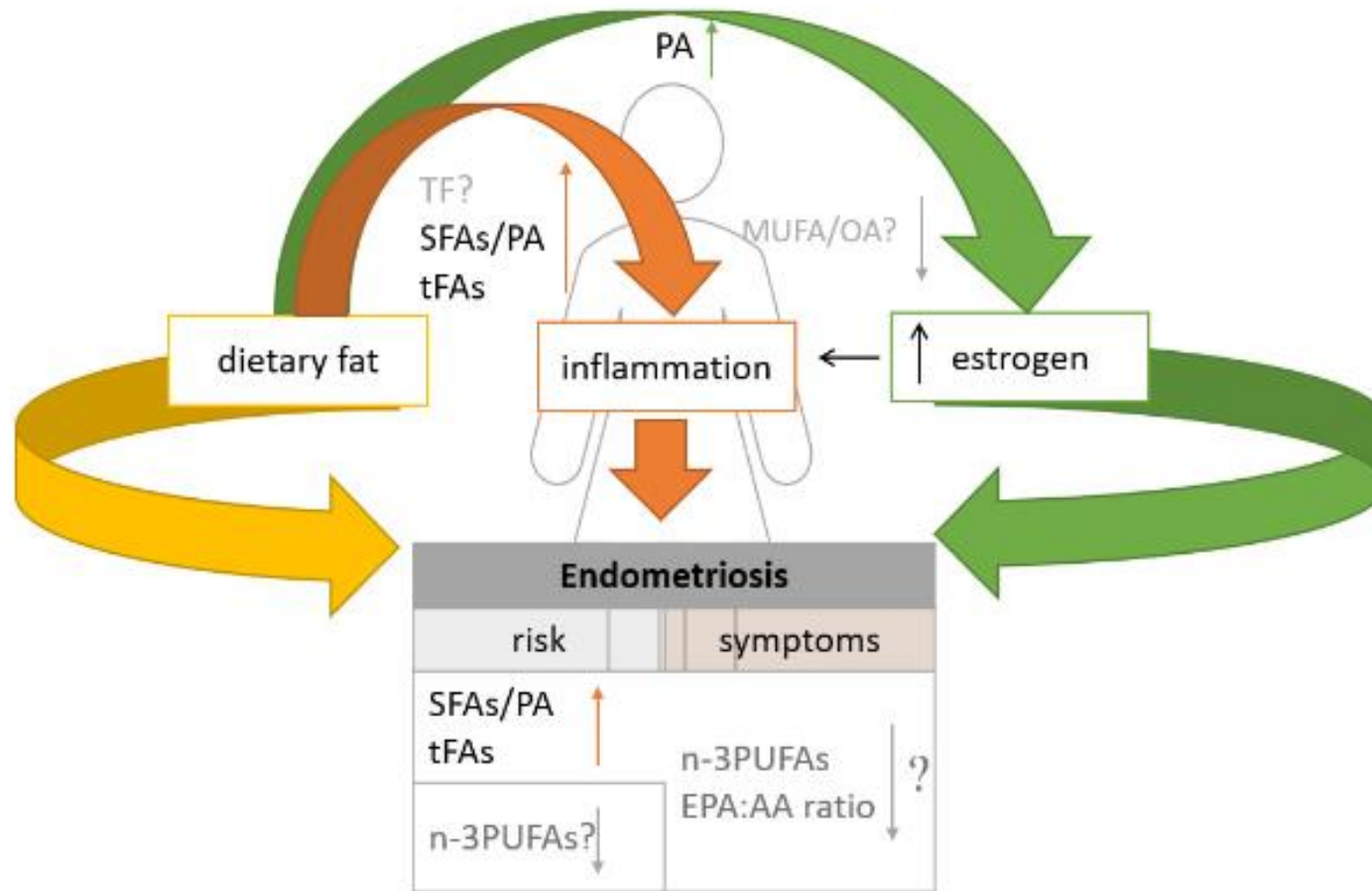
Francesco Giuseppe Martire ¹, Eugenia Costantini ¹, Claudia d'Abate ¹, Giovanni Capria ², Emilio Piccione ^{3,4,*}
and Angela Andreoli ⁵



- Emerging evidence indicates that dietary patterns may modulate the inflammatory environment associated with endometriosis, potentially **influencing symptom severity by affecting oxidative stress, estrogen metabolism, and levels of sex hormone-binding globulin (SHBG)**. Diets rich in antioxidants, polyunsaturated fatty acids (PUFAs), and vitamins D, C, and E—alongside the avoidance of processed foods, red meat, and animal fats—may offer beneficial effects.

Since chronic inflammation and excessive oxidative stress associated with ectopic lesions play a significant role in the development of endometriosis, nutrients that affect these processes could be pivotal in modifying the course of the disease.

Dietary supplements for treatment of endometriosis



Summary of the influence of dietary fats on endometriosis risk and related symptoms; TF—total fats; SFAs—saturated fatty acids; PA—palmitic acid; tFAs—trans-unsaturated fatty acids; MUFAs—monounsaturated fatty acids; OA—oleic acid; n-3 PUFAs—omega-3 polyunsaturated fatty acids; EPA:AA ratio eicosapentaenoic acid to arachidonic acid; ? -doubts; ↓ decrease; ↑ increase.

What is the role of herbal remedies and anti-inflammatory teas in managing endometriosis pain?



Impact of oxidative stress in men

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graph TD; A[Impact of oxidative stress in men] --> B["↑ROS<br/>↑advanced glycation end products (AGEs)<br/>↓endothelial nitric-oxide synthase"]; A --> C[Poor semen quality]; B -- "59% of diabetic men" --> D[Erectile Dysfunction]; C --> E["↓sperm density and motility, and<br/>↑in sperm DNA fragmentation<br/>↓ ejaculate volumes"]; D --> F["It has been shown that the high susceptibility of sperm to oxidative damage is correlated with poor conception, pregnancy loss, congenital defects, poor embryo development and childhood cancer"]; E --> F;
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↑ROS
↑advanced glycation end products (AGEs)
↓endothelial nitric-oxide synthase

59% of diabetic men

Erectile Dysfunction

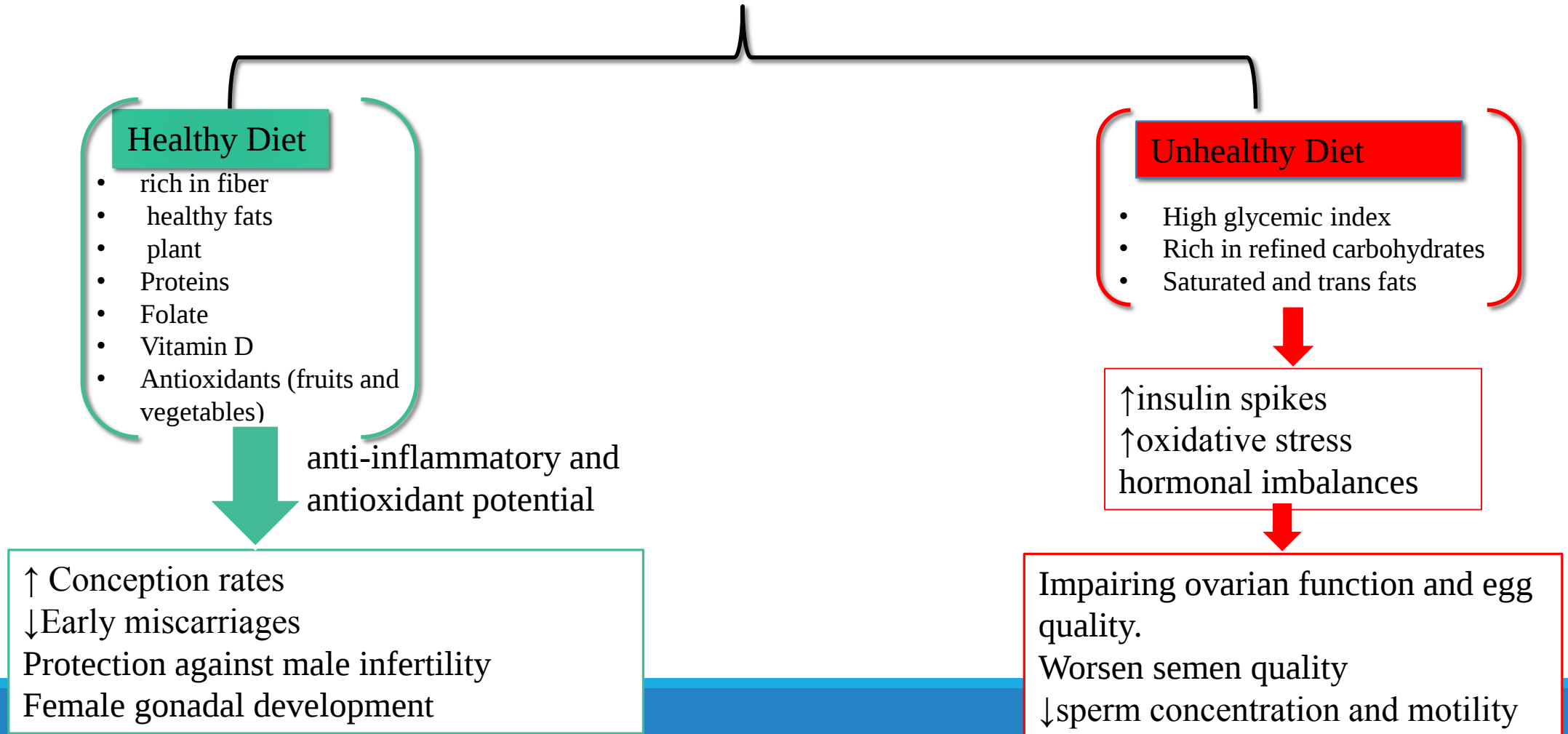
Poor semen quality

↓sperm density and motility, and
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It has been shown that the high susceptibility of sperm to oxidative damage is correlated with poor conception, pregnancy loss, congenital defects, poor embryo development and childhood cancer



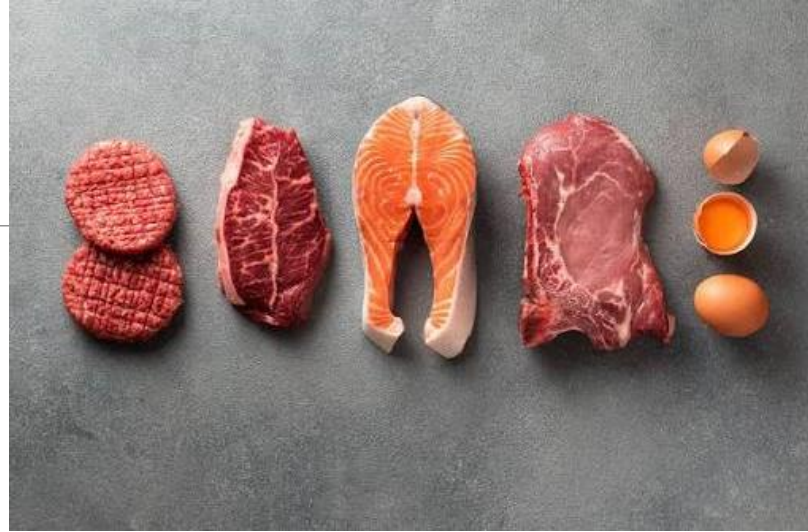
A well-balanced diet is better than supplementation!



Diet Component/Dietary Pattern	Active Components/Set of Components	Impact on Fertility
Vegetables and fruits	Plant protein	Plant protein is a super-fertile ingredient. Consuming 5% of energy from plant protein instead of animal protein reduces the risk of anovulatory infertility by over 50% [20]. Consuming only plant products in a vegan diet has a positive effect on semen quality [75].
	Antioxidants, vitamins, minerals, folic acid	Antioxidants are important for proper ovulation [9,55–60] and quality of semen [7,43,52,61,64]. A high amount of antioxidants in the diet greatly increases fertility, especially the antioxidants from berries and green vegetables [16,78,87,90–93].
	Fiber	A diet rich in vegetables and fruits promotes fertility [15,16,78,87,90–93,138]. Adequate supply of fiber along with the diet is crucial; too low and too high a dose negatively affects fertility [7,133,142,143].
Diet Component/Dietary Pattern	Active Components/Set of Components	Impact on Fertility
Western pattern	High-glycemic-index carbohydrates, sweets, beverages, animal protein, SFAs and TFAs, processed foods. Low consumption of FAVs, fiber, vitamins, and sea fish.	It has an antifertility effect and can increase the oxidative stress that causes carbohydrate disturbance. Insulin resistance or diabetes mellitus are related to the deterioration of fertility in women and men, mainly due to the generation of high oxidative stress, which is the main cause leading to an increased risk of infertility and hormonal disorders [16,17,19,86,88].
Low-carb pattern	Low content of carbs, high in fat	There is a lack of reliable research on long-term effects on fertility [141].
Gluten-free pattern	No gluten	Gluten-free diets have been shown to have lower nutritional value compared to traditional diets [144,145]. This is a risky nutritional intervention for fertility, given that it involves eating less fiber and more saturated fatty acids and foods with a higher glycemic index [146].

Diet Component/Dietary Pattern	Active Components/Set of Components	Impact on Fertility
Refined grains, sweets, sweetened beverages, meals with a high glycemic load	Excess simple sugars, low content of fiber	Eating foods with a high glycemic index and meals with a high glycemic load may lead to metabolic complications and increase the risk of insulin resistance, diabetes, dyslipidemia, and oxidative stress, which adversely affect fertility and reproductive function [32,109,133]. The consumption of sweetened beverages negatively affects fertility and may also reduce the chances of reproductive success with ART [135–137].
Red meat	SFAs	Processed red meat has been shown to have a particularly negative effect on fertility [152]. Saturated fat content has been linked to lower semen concentration in males [177] and has a particularly negative effect on ovulation [174]. Eating red meat before IVF had a negative effect on the development of the embryo and the likelihood of clinical pregnancy [178].
Processed foods and fast-food	TFAs	Trans-fatty acids (TFAs) appear to have the most negative impact on fertility. The more TFAs in a woman's diet, the greater the risk of ovulation disorders [166,168–170]. TFAs can also negatively affect semen quality and spermatogenesis [7,154].
Low-fat dairy products	Calcium, vitamins, probiotics	They can support the pro-fertility effect of the diet. It is recommended to choose low-fat dairy products, especially fermented. They have a positive effect on the gut microflora and reduce the risk of type 2 diabetes [7,195,197,198].
Oily sea fish	PUFA, omega-3, fat-soluble vitamins A, D, E, K	Fish are the most pro-fertile sources of fat and protein. They have a positive effect on semen parameters, the course of ovulation, and the success of fertilization [167,177,182–189]. Omega-3 fatty-acid intake should still be recommended to these groups as part of a healthy fertility diet [13].
Nuts, seeds	MUFA, fiber, tocopherols, phytosterols, polyphenols	The consumption of walnuts also has a positive effect on fertility due to the omega-3 content. The use of nuts in the diet may have a beneficial effect on the quality of sperm (longer viability, motility, and morphology) [172,177,185,190,191].
Avocado	MUFA, antioxidants, fiber, folate, potassium	Avocados are an important part of a woman's fertility diet as they contain much higher amounts of a key nutrient. Associated with better pregnancy outcomes [180].
Plant-based pattern	High in plant protein, antioxidants, fiber, polyphenols, vitamins, minerals. Low-processed food, well-balanced meals. Based on the assumptions of MD.	The plant-based diet, especially high-quality plant foods, can help prevent chronic disease [26]. The plant-based nutritional model can lead to a positive effect on a couple's fertility [15,16,18–20]. Plant-based diets that are high in fiber and polyphenols are also associated with a variety of gut microbiota that produce metabolites that have anti-inflammatory functions that can help manage disease processes, which can prove very beneficial in the context of infertility in couples [131].
Mediterranean pattern	High consumption of plant-derived food, oily sea fish, low-fat dairy and poultry, olive oil, and whole-grain products. Low consumption of simple sugars, red meat,	The MD decreased risk of all-cause mortality, cardiovascular disease, cancer, and other chronic diseases [46,52]. The MD supports proper ovulation in women [9,55–60] and has benefits in terms of sperm motility [52]. The MD model increases successful pregnancies by 40% among couples undergoing in vitro fertilization [63]. The MD should be recommended for couples undergoing in vitro fertilization [32].

Protein



Animal protein consumption has been associated with a higher risk of infertility due to a lack of ovulation. In turn, the intake of plant protein increases fertility among women >32 y. **The difference may stem from the disparate impact of plant and animal protein on insulin and IGF-I secretion. Insulin response is lower after plant protein consumption than following animal protein.** Protein intake—in particular animal protein—correlated negatively with testosterone concentrations among healthy women

Fats

(Trans Fatty Acid, Saturated Fatty Acid, Mono Unsaturated Fatty Acid, Poly Unsaturated Fatty Acid)

- High-fat diet can be associated with changes in the reproductive functions, **including menstrual cycle length, reproductive hormone concentrations [e.g., luteinizing hormone (LH)], and embryo quality in the ART cycles.**
- The intake of **TFAs** was associated with the incidence of endometriosis.
- **ω-3 FAs** can positively affect fertility, as they play an essential role in **steroidogenesis and have significant anti-inflammatory properties.** , the available studies indicate that ω-3 FAs from oily fish or supplements have a beneficial effect on the growth and maturation of oocytes, decrease the risk of anovulation, and improve embryo morphology, and are associated with higher concentrations of progesterone. Additionally, the consumption of seafood increases sexual intercourse frequency and provides greater fecundity.
- **MUFAs** can bind with the PPAR-γ receptor, thus decreasing inflammation and positively affecting fertility. **It is vital to note that the consumption of >3 portions of dairy/d decreases the risk of endometriosis diagnosis by 18%, when compared with the consumption of 2 servings.**

A high consumption of MUFAs and PUFAs (including a high consumption of ω-3 from oily fish or from supplementation) with a low consumption of TFAs and SFAs should be recommended to childbearing-age women trying to become pregnant.

Mediterranean Diet



The Mediterranean diet, inspired by the traditional dietary patterns of populations residing in the Mediterranean basin, is characterized by daily consumption of **seasonal fruits and vegetables, whole grains, legumes, nuts, virgin and extra virgin olive oil, moderate consumption of fish and dairy products, and limited consumption of red and processed meats, sweets and ultra-processed foods. Therefore, the Mediterranean diet is rich in fiber, monounsaturated fatty acids and antioxidants, while low in saturated fats.** This diet has been shown to be associated with a protective effect on fertility in both sexes In men, greater adherence to the Mediterranean diet correlates with significantly **improved sperm parameters, such as increased sperm concentration, motility, and viability, along with improved sperm DNA fragmentation.**

Take home messages

- The failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse defined as infertility
- Infertility affecting 8-10% of couples worldwide and 11.5% in Iran.
- Male infertility is solely responsible for 20–30% of infertility cases but contribute to 50% of cases overall.
- After mother's death, father's death and spouse's infidelity, infertility is ranked as fourth stressful life event.
- various components of diet and lifestyle may contribute to reducing the risk of fertility.
- Impact of both low and high BMI on fertility of both men and women .
- Obesity influence the fertility through insulin resistance and oxidative stress.
- The impact of nutritional factor on PCOS , endometriosis and male infertility.
- Not preference of any specific diet in fertility, **just healthy diet**
- A well-balanced diet is **better than supplementation.**

Thank you

