

# The Effect of Polycystic Ovarian Syndrome on the Quality of Embryo



# What is PCOS and Why Does It Matter for Fertility?

## Global Impact

Polycystic Ovarian Syndrome (PCOS) affects 6-13% of women worldwide, making it one of the most common endocrine disorders.

## Hormonal Imbalance

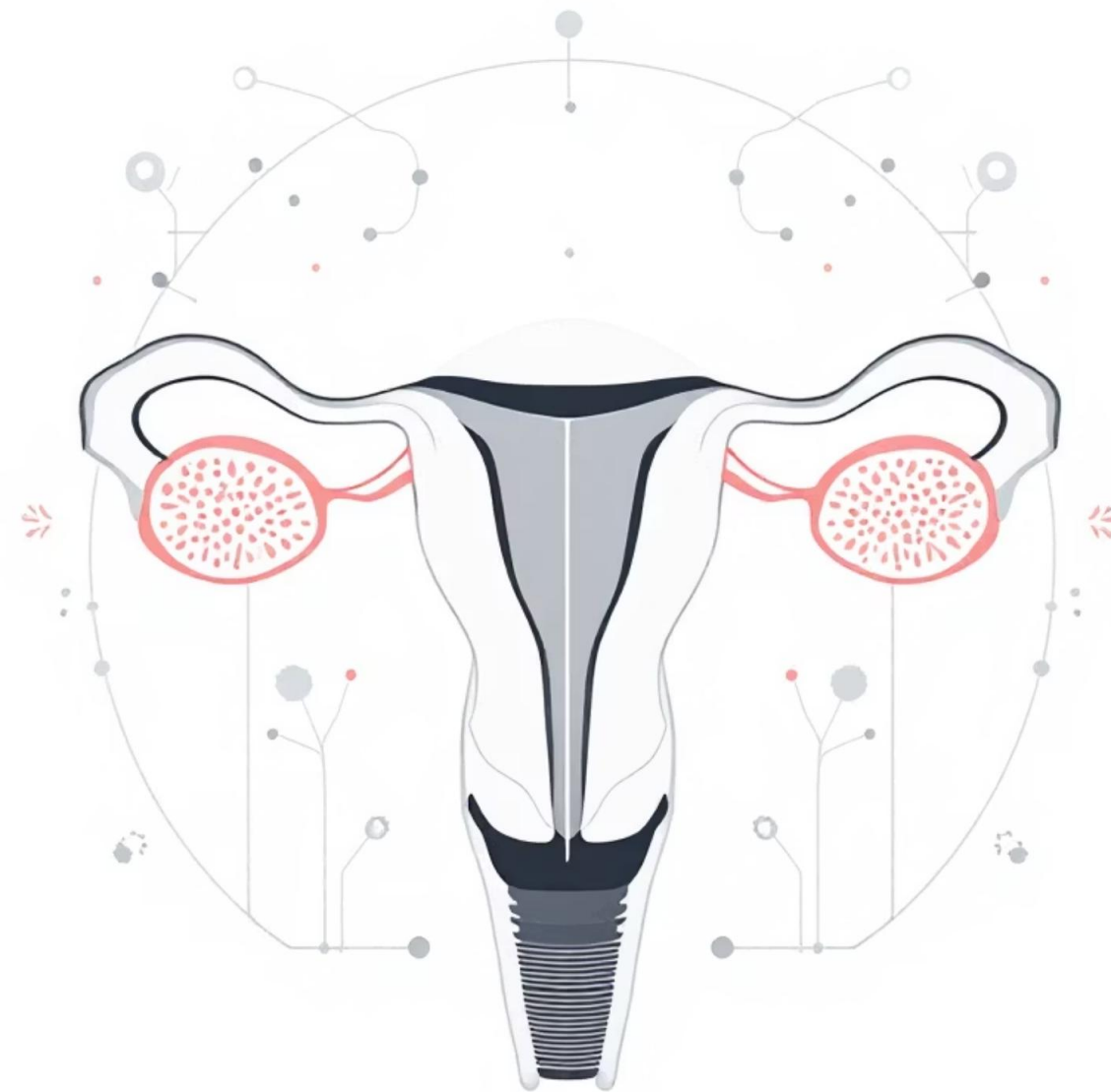
It's characterised by hormonal imbalances, including hyperandrogenism (excess male hormones) and insulin resistance, which disrupt the body's natural rhythms.

## Fertility Challenges

These imbalances directly impair ovulation, leading to irregular or absent menstrual periods and significant fertility challenges for many women.

## Diagnostic Criteria

Diagnosis typically requires at least two of the following: oligo- or anovulation, clinical or biochemical hyperandrogenism, or polycystic ovaries identified via ultrasound (Rotterdam criteria).



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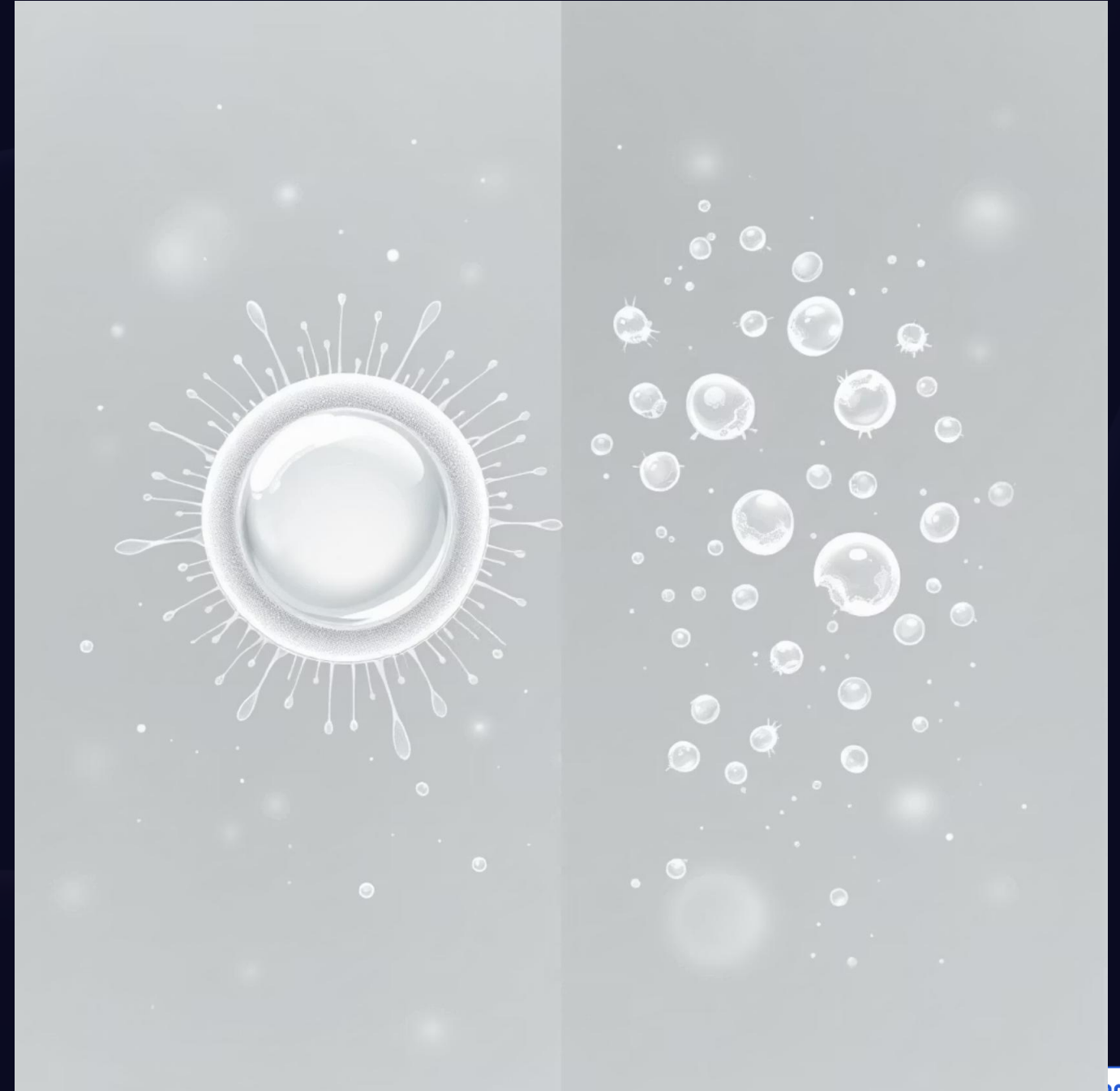
Polycystic Ovaries

# PCOS and Oocyte Quality: More Eggs, But Are They Better?

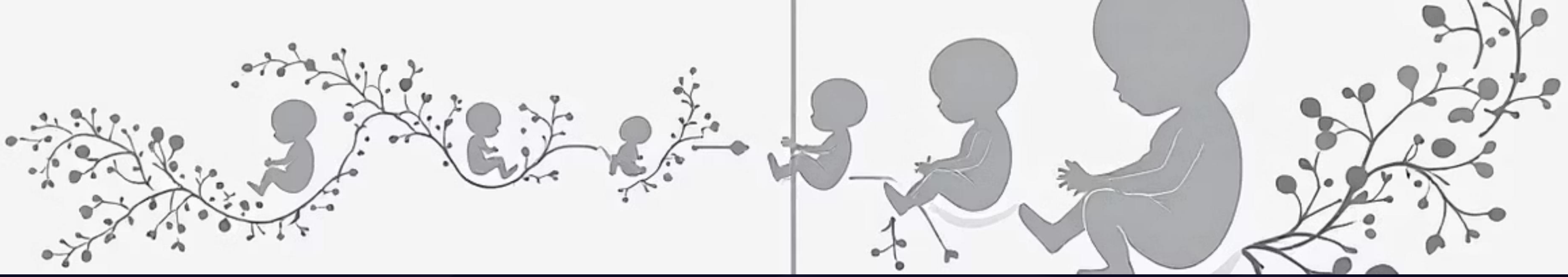
While women with PCOS often produce a higher number of oocytes during IVF cycles—for instance, an average of 22 compared to 12 in lean non-PCOS patients—the sheer quantity doesn't necessarily translate to superior quality.

Research indicates that PCOS oocytes frequently exhibit higher rates of morphological abnormalities. These structural issues are often linked to early miscarriage, highlighting a critical concern beyond just egg count.

The underlying hormonal disruptions, particularly elevated androgens and persistent insulin resistance, play a significant role. These factors impair proper egg maturation and compromise their developmental potential, impacting their ability to form viable embryos.







# Embryo Development in PCOS: Faster Growth but Higher Risk

1

## Accelerated Early Growth

Embryos derived from PCOS patients often demonstrate faster developmental rates during their initial stages, particularly reaching the 7-9 cell stage more quickly, especially noticeable in hyperandrogenic PCOS cases.

2

## Similar Fertilisation & Blastulation

Despite this rapid early development, the overall fertilisation rates and the progression to the blastocyst stage remain comparable to those observed in control groups without PCOS.

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## Elevated Miscarriage Rates

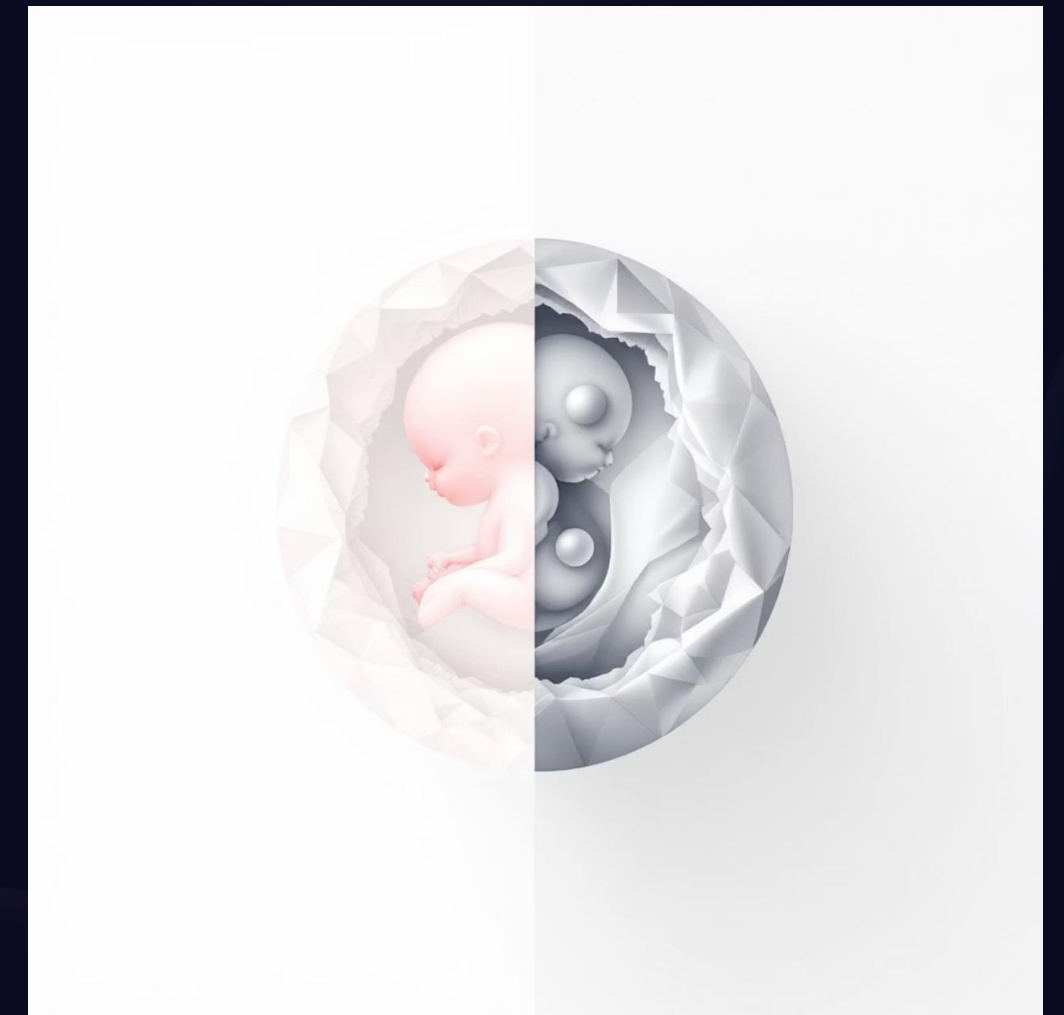
Crucially, PCOS is associated with significantly higher miscarriage rates (approximately 38% versus 19%), strongly suggesting that there are subtle embryo quality issues beyond what is visible morphologically.

# Impact of Obesity in PCOS on Embryo Quality and IVF Outcomes

Obesity significantly complicates PCOS, with obese PCOS patients typically exhibiting poorer embryo grades and notably lower implantation rates when compared to their lean PCOS counterparts.

Conversely, lean PCOS patients often present with more favourable IVF cycle characteristics. They tend to have a higher number of retrieved oocytes and a greater yield of embryos available for freezing, indicating better overall potential.

The presence of obesity exacerbates existing metabolic and hormonal disturbances within PCOS. This compounding effect further impairs both embryo quality and the ultimate success rates of pregnancy, making weight management a critical factor.



# Clinical Pregnancy and Live Birth Rates in PCOS Patients



## Similar Clinical Pregnancy Rates

Despite retrieving a higher number of oocytes, the clinical pregnancy rates in PCOS patients are often similar or marginally lower than those observed in non-PCOS individuals.



## Elevated Miscarriage Risk

The increased rates of miscarriage in PCOS are strongly theorised to be linked to abnormalities in oocyte and embryo quality, which can impede sustained pregnancy.



## Optimising Live Births

Aiming for an optimal oocyte retrieval count, typically around 11 eggs, helps balance live birth rates while simultaneously mitigating risks such as Ovarian Hyperstimulation Syndrome (OHSS).



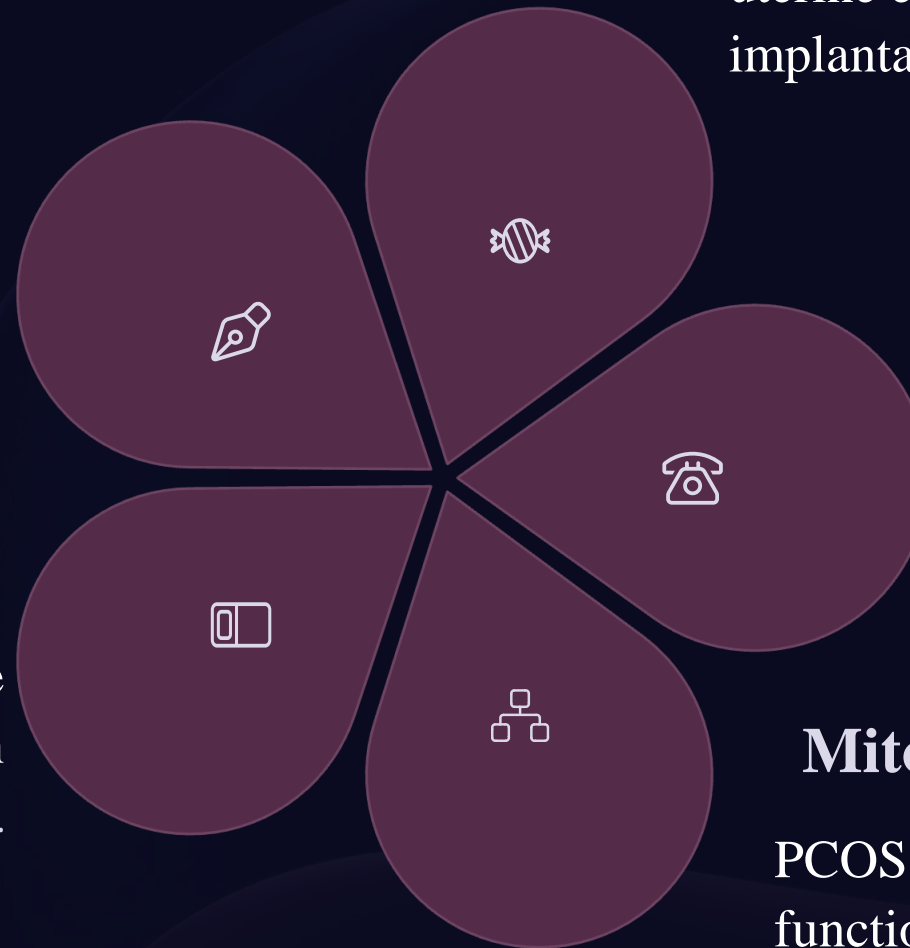
# Underlying Mechanisms: Hormonal and Metabolic Influences

## Hyperandrogenemia

Elevated androgen levels alter gene expression within oocytes, critically affecting the earliest stages of embryo development and viability.

## Oxidative Stress

Increased oxidative stress levels in the follicular fluid of PCOS women can damage oocytes and early embryos.



## Insulin Resistance

This metabolic dysfunction, often accompanied by inflammatory cytokines, creates an embryotoxic uterine environment, significantly impairing successful implantation.

## Disrupted Folliculogenesis

Irregular ovarian follicle development leads to the release of immature or compromised eggs, thereby reducing the embryo's developmental competence.

## Mitochondrial Dysfunction

PCOS oocytes may have impaired mitochondrial function, which is crucial for energy production and proper embryo development.



# Strategies to Improve Egg and Embryo Quality in PCOS



## Lifestyle Modifications

Adopting a balanced diet, engaging in regular exercise, and effective stress reduction techniques can profoundly improve hormonal balance and metabolic health.



## Optimised IVF Protocols

Implementing careful and mild ovarian stimulation protocols during IVF can reduce associated risks and significantly improve the quality and developmental potential of embryos.



## Targeted Supplementation

Supplements such as Myo-inositol are known to help regulate insulin sensitivity and androgen levels, leading to an enhancement in overall egg quality.

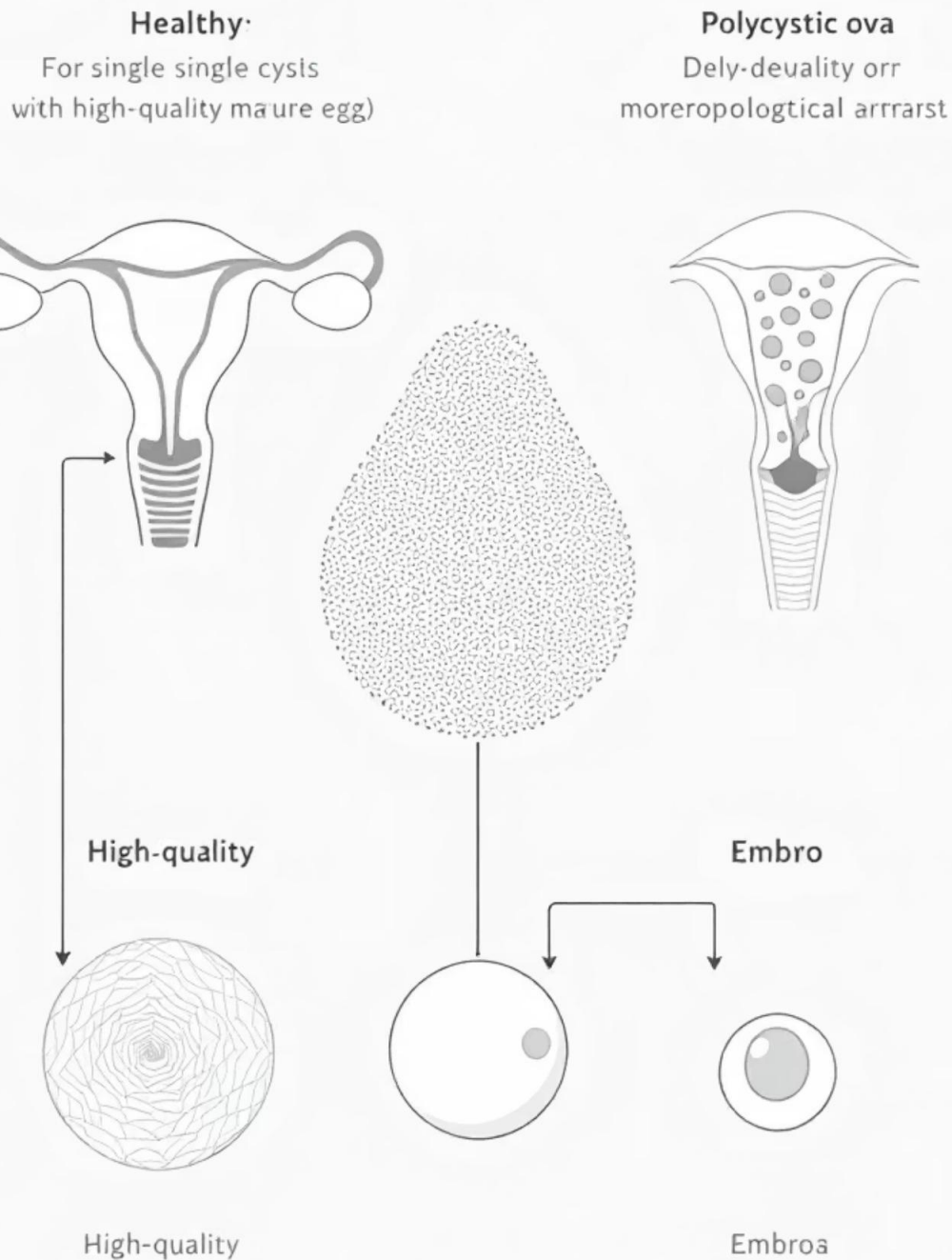


## Weight Management

For obese PCOS patients, achieving a healthy weight through diet and exercise can mitigate metabolic disturbances and positively impact IVF outcomes.



## More eggs + better embryos: Quality is key



## Visual Summary: PCOS Effects on Embryo Quality and IVF Success

While PCOS patients may produce more eggs, the quality of these eggs and subsequent embryos is often compromised. Quality is indeed key for successful IVF outcomes.



# Conclusion: Understanding and Managing PCOS for Better Embryo Quality

## ■ Significant Impact

PCOS substantially impacts embryo quality through complex hormonal and metabolic disruptions, posing unique challenges to fertility.

## ■ Quality Over Quantity

Despite producing a higher number of oocytes, the compromised embryo quality often leads to reduced pregnancy success and higher miscarriage rates in PCOS patients.

## ■ Tailored Interventions

Personalised treatments and lifestyle interventions are crucial for improving fertility outcomes and increasing the chances of successful live births in individuals with PCOS.

## ■ Future Research

Ongoing research is vital to further unravel the intricate mechanisms of PCOS on reproduction, paving the way for more effective strategies to optimise embryo quality and improve live birth rates.

A close-up, sepia-toned photograph of a person's face and hands. The person's eyes are closed, and their hands are clasped near their face. A dark, semi-transparent banner is overlaid across the middle of the image, containing the text "Thank you for your attention" in a bold, yellow, sans-serif font. The bottom of the image is a solid grey bar.

**Thank you for your attention**