

CoenzymeQ10 for Female Fertility

Key Findings

- A woman's age is one of the biggest [risk factors for infertility](#), mainly due to the aging of egg cells.¹
- Coenzyme Q10 (CoQ10) has beneficial effects on female fertility ^{3,4,5}
- Studies have shown that supplementation with CoQ10 can improve ovarian function ³ and egg quality in women 30+ years. ⁵

Eggs, Ageing, and ART

More and more often, people are turning to assisted reproductive technologies (ART), such as IVF, in the hope of having a baby. Whilst we are lucky to live in a time when this is possible, these technologies do not come without challenges. ART treatments are expensive, and can be emotionally and physically draining, especially if they don't go to plan.

Many women experience poor response to elements of [ART treatments](#), such as ovarian hyperstimulation, and end up with higher cycle cancellation rates, lower numbers of egg retrievals, lower quality eggs, and fewer embryos to transfer than hoped for. The frustration and disappointment that comes with a failed cycle only adds to the already existing challenges of ART treatments.³

CoQ10 and Female Fertility

A recent [randomised controlled trial](#) looked at 169 women under the age of 35 with poor ovarian reserve. They gave 1/2 the women CoQ10 supplements for 60 days prior to their IVF-ICSI cycle, and the other 1/2 had no pre-treatment. After the IVF cycle, the women in the CoQ10 group had a higher number of eggs retrieved, higher fertilization rates, and an increased number of high-quality embryos. ³

In addition to this, significantly less women in the CoQ10 group had canceled embryo transfers because of poor embryo development than those in the control group (8.33% vs. 22.89%) and many more women from the CoQ10 group ended up with frozen embryos than the other group (a whopping 18.42% vs. just 4.3%).³

This [systematic review](#) looked at whether CoQ10 improved fertility outcomes for women undergoing ART treatment. It found that CoQ10 supplementation increased total clinical pregnancies for women undergoing ART treatment, and it was also shown to increase pregnancies for infertility subgroups of women with Polycystic Ovary Syndrome (PCOS) and poor ovarian response.⁴

Mechanism

Although the exact reasons why some women experience [poor ovarian response](#) is not entirely clear, oxidative stress and mitochondrial dysfunction have been suggested as two potential causes. [Mitochondrial dysfunction](#) can increase oxidative stress, which has a similar effect on the reproductive cells as aging does.⁴

CoQ10 is an *antioxidant* which combats oxidative stress. [CoQ10](#) is thought to improve age-related deterioration of the egg cells by enhancing mitochondrial function, autophagy (the way your body reuses old/damaged cells), anti-apoptosis (reducing the death of cells), and regulating your immune system.⁵

The potential benefit of supplementing with CoQ10 on fertility is promising. The above studies give a solid snapshot of what many more scientists have also discovered, that CoQ10 has promising anti-aging effects on egg cells, and can therefore be considered a valuable fertility-supporting supplement.

Bioavailability: Ubiquinol vs Ubiquinone

There are some interesting differences between ubiquinone and ubiquinol. It should be mentioned that, there are a lot of marketing claims that ubiquinol is more *bioavailable* (i.e. more readily absorbed) than ubiquinone, the jury is still out on this point, due to mixed results in studies across the board. Ubiquinone remains the most studied form of COQ10, especially on fertility. ⁹

Comparison Table Between Ubiquinone and Ubiquinol

Ubiquinone	Ubiquinol
Less expensive	More expensive
More shelf stable	Less shelf stable
More well-researched	Less well-researched
Not susceptible to oxidation	Susceptible to oxidation (converts to ubiquinone)
Less bioavailable in some forms?	More bioavailable?

Table 1: Ubiquinone versus ubiquinol, B. Madsen, healthandscience.eu

Ubiquinol is susceptible to oxidation on the shelf, this mean that many ubiquinol supplements available are actually ubiquinone. ⁹ Some studies have suggested that whether you take ubiquinone or ubiquinol matters less to its effectiveness than the physical delivery form of the supplement eg. powder, capsule or tablet. ⁶

CoQ10 has notoriously low bioavailability. ⁹ Recent advancements in nutrients delivery technology has improved both absorption and bioavailability of ubiquinone powder in supplements by modify micelles, decreasing lipophilicity and change particle size. ⁷

Absorption, pharmacokinetics and Pharmacodynamics

Coenzyme Q10 is a lipophilic molecule and therefore absorption is enhanced when taken with a fatty meal. The capsule dissolves in the stomach and CoQ10 is then incorporated into micelles in the duodenum. The micelles breakup in the enterocytes and release the CoQ10. Some of the CoQ10 is absorbed in the enterocytes and attached to chylomicrons. The CoQ10 as part of the chylomicrons is passed into the lymph as ubiquinone. Inside the lymph, the ubiquinone is reduced to ubiquinol and is predominately passed to the blood as ubiquinol. It appears that divided doses of CoQ10 are best, as the maximum the gastrointestinal absorption rate is around 100-150 mg.⁹

From a pharmacodynamic perspective, CoQ10 has an excellent safety profile but in rare cases can cause mild gastrointestinal upset.⁴ Studies have consistently shown CoQ10 preparations to have a T max of 6 hours, and from absorbed CoQ10 the half life is 33 hours.⁹

Recommended Dosage

A systematic review on CoQ10 studies exploring ovarian aging, the dosages ranged from 180 mg to 1200 mg per day.⁴ The duration of treatment also varied from 8-12 weeks. The therapeutic goods administration (TGA) recommends when used internally, the maximum recommended daily dose must not provide more than 300 milligrams of combined ubidecarenone and ubiquinol.¹¹

Safety

Coenzyme Q10 is generally regarded as safe and can be taken in pregnancy.¹⁰ Coenzyme Q10 is structurally related to vitamin K2. For this reason it may interfere with the antithrombotic effects of drugs such as warfarin and other oral anticoagulants.⁸

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