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BEYOND SPERMOGRAM, A NUTRITIONAL STRATEGY CAN IMPROVE SPERM GENETICS

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Impact of ROS* on sperm[1,2,3,4,5]

Environmental factors | Aging | Diet & Obesity | Infections & Inflammation



Epigenetic/genetic aftermath



Consequences on sperm

Abnormal morphology | Impaired motility | Impaired epigenetics



Consequences on IVF outcomes

Poor embryo quality | Miscarriage risk | Offspring health concern



* Reactive Oxygen Species

1 - Wang Y, et al. Front Endocrinol 2025
2 - Nguyen HDK, et al. Reprod Med Biol 2025
3 - Machalowski T, et al. Int J Mol Sci 2025
4 - Li F, et al. Sci Rep 2024
5 - Cassuto N-G, et al. Genes 2025
6 - Ghaemi M, et al. Food Sci Nutr 2024
7 - Viot, G, et al. J Assist Reprod Genet 2025
8 - Mohammadi P, et al. BJU Int 2018
9 - Salehi P, et al. Cryobiology 2024

Reducing sperm DNA fragmentation and optimizing the expression of critical genes through a combination of myo-inositol and an antioxidant complex

Population

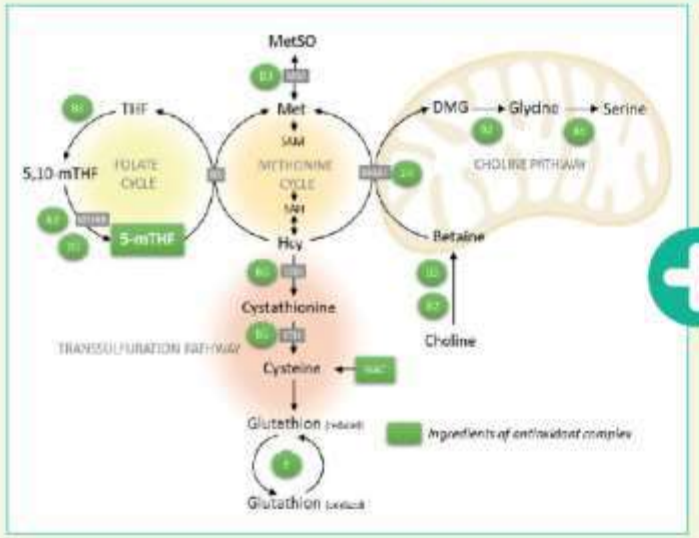
- n=28 men (20-45 yo) included in an IVF/ICSI project with a sperm DNA fragmentation rate ≥ 30%

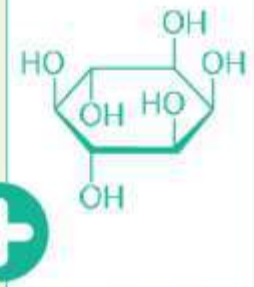
Pre-Post study endpoints

- DNA fragmentation (TUNEL)
- Spermogram (WHO)
- mRNA AURKA, HDAC4, CARHSP1 (RT-qPCR)

Intervention

- 4-month daily supplementation with myo-inositol (1g) + an antioxidant complex targeting the one-carbon metabolism [7,8]

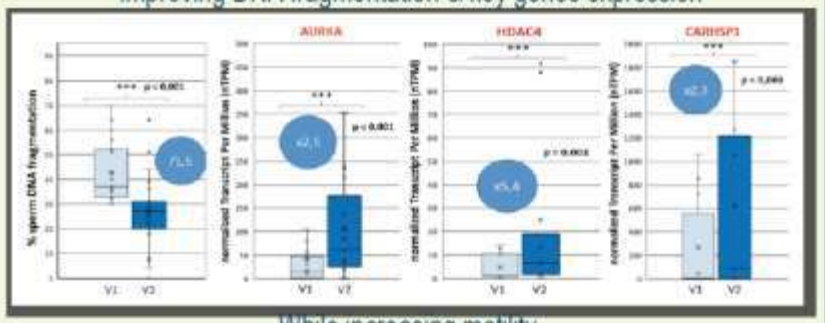




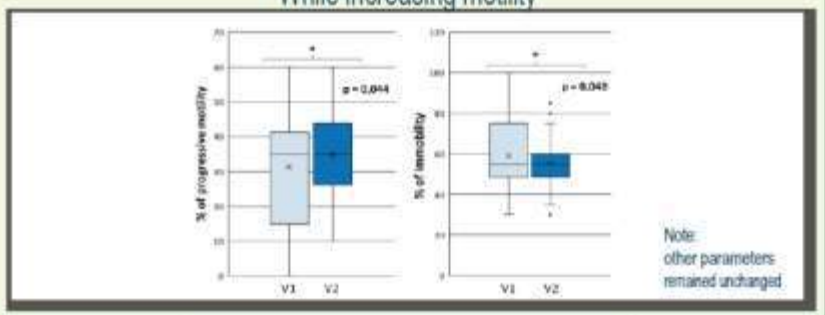
Essential roles of myo-inositol [9]:
- Mitochondrial function
- Cytoplasmic Ca++ level
- Capacitation
- Motility

RESULTS

Improving DNA fragmentation & key genes expression



While increasing motility



Note:
other parameters remained unchanged

CONCLUSIONS

A multi-targeted nutritional strategy that simultaneously addresses oxidative stress and epigenetic methylation processes can significantly reduce DNA fragmentation, improve the expression of genes critical for fertilization rate and early embryo development, and enhance gamete mobility.

This approach, which is not only widely accepted but also well tolerated, paves the way for new approaches to the treatment of male infertility.

Concurrently, DNA fragmentation and gene expression should be taken into account in the evaluation of male infertility, along with the classical semen analysis.

This pilot study will nevertheless need to be confirmed in a larger sample as part of a randomized trial.

Mandatory CoI statement on behalf of all authors

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