

# 17<sup>th</sup> World Congress of the Academy of Human Reproduction

15–18 March 2017  
Rome, Italy

## TITLE

**MALE OBESITY AFFECTS THE MOLECULAR COMPOSITION OF THE MOTILE SPERM AND ALTERS THE PRE-IMPLANTATION EMBRYO MORPHOKINETICS.**

## AUTHOR/S

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## ABSTRACT

**Context:** The prevalence of excessive weight or obesity is elevated among young men of reproductive age. Accumulated evidence suggests that acquired obesity remains in the male gamete and can modulate the phenotype of the offspring.

**Objective:** We aimed to assess the drawbacks of obesity on the molecular composition of the motile sperm and on the pre-implantation embryo morphokinetics.

**Methods:** Prospective analysis of semen samples in a single-site fertility clinic.

**Patient(s):** The semen samples were obtained from 96 men attending the A-clinic fertility center, Lebanon. Patients were categorized into normal weight, overweight, and obese according to their body mass index and waist circumference.

**Main Outcome Measure(s):** Histone retention, Chromatin compaction and methylation, Morpho-kinetic parameters of early embryo development.

**Result(s):** Our results showed that the motile sperm of obese men had higher levels of retained histones ( $p < 0.001$ ), elevated percentage of decompacted chromatin ( $p < 0.001$ ), hypomethylated DNA ( $p < 0.05$ ), and hypohydroxymethylated DNA ( $p < 0.001$ ) as compared to the motile spermatozoa of normal weight men. In addition, the time of pronuclei appearance ( $p < 0.001$ ) and fading ( $p < 0.05$ ) were significantly shorter in the zygotes derived from an obese father when compared to a normal weight one. The embryonic cell cycles CC1 ( $p < 0.05$ ), CC2 ( $p < 0.05$ ), and CC3 ( $p < 0.05$ ) were significantly delayed in the cleavage embryos of the obese group as compared to the normal one. After the activation of the embryonic genome, there was a significant reduction in the compaction rate ( $p < 0.05$ ), in the blastulation rate ( $p < 0.05$ ), and in the quality of the tropho-ectoderm layer of the blastocyst ( $p < 0.04$ ) in the obese group.

**Conclusion:** Male obesity may affect the molecular composition of the motile sperm and may alter the pre-implantation embryo morphokinetics.

## INSTITUTE

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