



27th ANNUAL MEETING

Sociedade Portuguesa
de Genética Humana

23 - 25 NOV 2023

Lisboa



Design: Marisa Silva

ABSTRACT BOOK



CUMULUS CELL DAMAGE INDIRECTLY HELPS TO PREDICT OOCYTE QUALITY IN INFERTILE FEMALES UNDERGOING ICSI

Bárbara Rodrigues^{1,2,3,4,5}, Vanessa Sousa^{1,2,3,4,5*}, Filipa Esteves^{3,4,5}, Joana Pires^{3,4,5}, Daniela Sousa⁶, Raquel Brandão⁶, Carla Leal⁶, Rosário Santos^{1,2,3}, Emídio Vale-Fernandes^{2,3,6}, António J. A. Nogueira⁷, Solange Costa^{3,4,5}, Paula Jorge^{1,2,3}*

Introduction: Intracytoplasmic sperm injection (ICSI) is currently used in clinical practice for couples with fertility issues. Some studies have shown an association between male reproductive ability and sperm DNA damage levels, assessed by comet assay. However, little is known regarding this endpoint and female fertility, mostly due to tissue accessibility. To overcome this, we used cumulus cells (CC) to analyze DNA damage in search of correlation with clinical parameters evaluated in the context of infertility.

Methodology: DNA damage was assessed via comet assay, in two different tissues, blood and CC, from females undergoing ICSI: 22 potentially fertile and 35 infertile. DNA damage levels (%TDNA) were compared between the two groups (fertile vs infertile), and correlated, within each group, with hormone levels, stimulation days, number of cumulus-oocyte complexes (COCs) retrieved, and oocytes injected. All analysis were performed using SigmaPlot version 14.0 (Systat Software® Inc., Chicago, IL, United States).

Results: No significant differences were found in %TDNA levels between the 2 groups. However, the DNA damage observed in CC was notably increased in the infertile females

when compared to the potentially fertile, although it did not reach statistical significance. Interestingly, %TDNA in CC was significantly correlated with the number of oocytes injected, in both groups. This finding was not observed in the blood. Moreover, the difference between number of COCs retrieved and oocytes injected was significantly higher in the infertile females group and showed a correlation with the damage observed in CC.

Discussion: Our results established a correlation between DNA damage in CC and oocyte quality. CC support and nurture oocytes during development, but DNA damage in CC can predict a reduced oocyte quality and availability for injection. This finding underscores the importance of CC in oocyte development and emphasizes the need to consider tissue-specific effects in DNA damage studies, particularly those related to fertility and reproductive health. Nevertheless, further studies are needed to confirm our results.

¹ Serviço de Genética Laboratorial, Clínica de Genética e Patologia, Centro Hospitalar Universitário de Santo António (CHUdSA), Porto, Portugal

² UMIB - Unit for Multidisciplinary Research in Biomedicine, ICBAS - School of Medicine and Biomedical Sciences, University of Porto, Porto, Portugal

³ ITR - Laboratory for Integrative and Translational Research in Population Health, Porto, Portugal

⁴ Environmental Health Dept, National Institute of Health, Porto, Portugal EPIUnit

⁵ Instituto de Saúde Pública da Universidade do Porto, Portugal

⁶ Centre for Medically Assisted Procreation/ Public Gamete Bank, Centro Materno-Infantil do Norte Dr. Albino Aroso (CMIN), Centro Hospitalar Universitário de Santo António (CHUdSA), Porto, Portugal

⁷ CESAM - Center for Environmental and Marine Studies, Department of Biology, University of Aveiro, Aveiro, Portugal

* equal contribution