NUCLEASE ACTIVITY AND PROTEOMIC ANALYSIS IN HUMAN SEMINAL PLASMA: TOOLS FOR THE IDENTIFICATION OF NEW MALE INFERTILITY BIOMARKERS

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Some studies have shown that complementary biomarkers are needed to the semen analysis in order to provide a more accurate diagnosis to couples with infertility problems. Ninety-four samples were analyzed using the Single Radial Enzyme Diffusion (SRED) for nuclease activity in seminal plasma and the alkaline and neutral Comet assay for sperm DNA fragmentation (SDF). Moreover, 24 samples were selected and analysed using 2D-DIGE according to: pathology, rate of sperm with completely degraded DNA relative to total sperm with fragmented DNA (DDS) using sperm chromatin dispersion (SCD) and SDF using alkaline and neutral Comet assay.

Nuclease activity analyzed in seminal plasma is higher in patients groups than in control group. It correlated with sperm motility and morphology, and SDF measured by alkaline Comet assay. ROC curves revealed that although alkaline Comet assay was better, SRED was a good method to determine male infertility. By proteomic analysis, twenty-six spots were differentially expressed in fertile donors (FD), as compared to the other groups. Recurrent miscarriage (RM) and fertile donors groups showed four spots differentially expressed. Asthenoteratozoospermic (ATZ) and asthenoteratozoospermic with varicocele (ATZ-VAR) groups showed three spots with similar protein expression. Other eight and two spots were only expressed in the ATZ and ATZ-VAR groups respectively. Forty-one spots of interest were submitted to mass spectrometry identification and 31 were identified.

In conclusion, nuclease activity and proteomic analysis in seminal plasma have allowed the identification of new candidates that could be useful as complementary parameters in male infertility diagnosis.