

**Abstract ID:-** 106

**Abstract Topic:-** Molecular and cytogenetic diagnostics

**Abstract Title:-** Exploring the interplay between potential apoptosis oxidative stress and DNA fragmentation in sperm of infertile patients

**Presenting author name :-** Nidhi Tripathi

**Presenting author institute:-** Bhu

**Aims:-** Infertility is a major health problem world-wide and is estimated to affect 8–12% of couples in the reproductive age group. Male infertility is a global population health concern. There are an estimated 48.5 million couples with infertility worldwide. The integrity of sperm DNA is crucial for successful fertilization and the development of a healthy embryo. Sperm cells require adequate MMP for proper energy production and motility.

**Methods:-** Semen collection and evaluation of conventional sperm parameters (concentration, motility, and morphology). Determination of the integrity of MMP (mitotracker red), apoptotic parameter (Annexin/PI), oxidative stress (DCFDA) and DNA fragmentation (TUNEL assay) by using flowcytometry techniques

**Results:-** Disruption of MMP and increased ROS levels can lead to oxidative stress, which can cause DNA damage and fragmentation. This damage can trigger apoptotic events in sperm cells. Annexin V binding to sperm cells can be indicative of DNA fragmentation and apoptotic events in the sperm population

**Conclusions:-** The mitochondrial membrane potential is a critical parameter in sperm biology, affecting sperm motility and overall fertility. High levels of apoptosis in sperm cells may lead to reduced motility, viability, and DNA integrity of the sperm, all of which are important for successful fertilisation. High levels of DNA fragmentation in sperm have been associated with lower pregnancy rates, increased miscarriage rates, and decreased embryo development. ROS can directly damage DNA structure, trigger apoptosis pathways, and disrupt mitochondrial function, resulting in impaired semen parameters.

**Keywords:-** Mitochondrial membrane potential, sperm DNA fragmentation