SUMMARY OF PROPOSED RESEARCH
(Do not exceed the space provided)

Describe clearly and concisely, in language readily understandable to a biomedical scientist who may not be a specialist in the research project's field, the broad objectives, specific aims, general procedures, and the potential significance of the research.

Project Summary

Apoptosis or selective cell death plays an important role in the pathogenesis of male infertility. Failure of fertilization in assisted reproduction despite the use of morphologically normal and motile spermatozoa may be due to an on-going process of apoptosis. Therefore, the use of apoptotic spermatozoa may be one of the reasons behind the poor success rates of widely used assisted reproductive techniques in patients with male factor infertility.

Early phases of apoptosis are associated with asymmetry of the cell phospholipids. The phospholipid phosphatidylserine (PS) becomes externalized to the outer surface of the cell membrane and may be used as an early marker for apoptosis. Because annexin-V has a high affinity for PS, when it binds to spermatozoa, it signifies that the integrity of the membrane has been disturbed. The procedure of magnetic activated cell separation (MACS) coupled with annexin V-conjugated microbeads may be used to separate 2 sperm fractions: positive (labeled apoptotic spermatozoa) and negative (unlabeled with intact membranes).

The main objective of our study is to examine the value of integrating MACS in sperm preparation steps prior to assisted reproductive techniques. This can be achieved by correlating the amount of externalized phosphatidylserine to the fertilizing potential of the respective sperm populations. To achieve our aims, spermatozoa contained in semen samples will be separated by MACS into apoptotic and non-apoptotic populations. Subsequently, the resulting sperm populations will be evaluated for the presence of apoptotic markers as well as the assessment of the fertilization potential using the sperm penetration assay.

The potential significance of our study lies in selecting a pure population of non-apoptotic sperm. The use of these highly pure intact spermatozoa is expected to enhance efficiency of assisted reproductive techniques, which will result in reduced burden to patients under therapy, and financial savings due to increased probability of therapeutic success

Please provide five Key Words that best describe your project:

(1) Annexin (2) Apoptosis (3) Magnetic cell separation

(4) Sperm (5) Male infertility