

## **Chapter 6**

# **Future Research Prospects**

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Progress in any field can only occur through research. There have hardly been any publications by Indian scientists in the area of ART in peer reviewed, internationally reputed, scientific journals, except for a few that appeared from the Institute for Research in Reproduction in the late 1980's. Consequently, much of ART practice that is used in India is based on papers published outside India, and there is hardly any information either on the basic profile of the infertile couples in India or even on the clinical experience in respect of the ART technologies developed elsewhere but used in India as per the Western protocols.

ART offers a unique situation to study the biology of reproduction in human subjects without compromising ethical issues. For example, it is perfectly legitimate and ethical to take tissue and body fluid samples from an infertile couple to study the cause of infertility. This is an area that has not been exploited in India. Another line of research that is extremely important is to study early embryonic development – subject that has remained in darkness for quite a long time. What kinds of genes are turned on and off at different stages of pre-implantation embryos? This would aid in developing methods for implanting only the appropriate embryos in individuals who are known carriers of inheritable genetic disorders. Can embryos be used for developing tissues or organs (kidneys, pancreas etc.) for replacement? Stem cells obtained from developing embryos hold much promise in this field of biotechnology. There is hardly any serious research going on in such areas in the country. It must be borne in mind that one important area of future medical advances, is gene therapy, and such therapy may require *in vitro* fertilization and development.

What is urgently required is the identification of projects that are of value to advance our knowledge of human reproduction and develop better methods for treating infertility, or even identify better contraceptives because infertility is the kind of situation that we intend to create in a fertile couple desirous of limiting their family size. Following such identification, research in reproduction, with special reference to infertility treatment, must be

identified as a priority area for research for funding by the national scientific agencies.

### **6.1 Pre-implantation Genetic Diagnosis and Chromosomal and Single-Gene Defects**

There is a growing volume of information that is now available showing that many forms of infertility are caused by genetically transmittable disorders. The genetic disorders include trisomy, translocations, inversions, deletions and microdeletions. All this new information suggests that great care must be exercised with ART because infertile couple may be carriers of such disorders; when one tries to force fertilization, the question arises whether one is transmitting genetic disorders to the offspring. This raises many moral and ethical issues.

One way to get around this problem is to institute top-class genetic diagnostic facilities that will be able to carry out diagnosis of genetic defects in single cells obtained from embryos. This is a very expensive and labor-intensive project and therefore there is a need to establish just a few well-equipped centers in the country and later expand them if there is a need. These centers could serve as referral centers and should be used judiciously. The establishment of such centers will go a long way in placing ART practice in India on a firm, healthy and ethical footing.