2. Aims and Objective

Oxidative stress has been considered as the prime causes for induction of male infertility. As per WHO (2016), the rate of primary infertility in India is between the range of 3.9 to 16.8%, where West Bengal shares 13.7%, Andhra Pradesh contributes about 5 %, Himachal Pradesh and Maharastra are having with 5% of the infertility related problems. Low level of sperm function due to oxidative stress induced DNA damage is a major contribution for the onset of infertility. On the other hand, some social influence like divorce, prostitution, pre-marital sex etc are considered as other causative domains for the onset of infertility. Other physiological factors such as low sperm count, sperm morphological abnormalities, varicocele, abnormal synthesis and secretion of androgens etc also contributed a prime role for increasing the rate of infertility worldwide. Nutraceuticals are considered as the alternative of medications without having any side effects. Moreover, these nutraceuticals are rich in antioxidant which is a major avenue for disease management. Lycopene is such a nutraceutical having high potency in the management of stress induced pathophysiological abnormalities. It has been reported that lycopene has important role in preventing free radical induced sperm damage. Considering that background, the Ph.D. work has been performed to explore the role of lycopene on cyproterone acetate treated male reproductive abnormalities. All the experiments have been performed considering the following aims and objective-

- To ensure the development of the infertile animal model by oral administration of potent dose of cyproterone acetate.
- To standardise the most effective dose of lycopene having maximal potentiality to recover the cyproterone acetate induced male hypo-testicular dysfunction.
- To determine the threshold duration of treatment with lycopene by performing duration dependent study in connection to the rectification of cyproterone acetate induced infertility in Wistar strain albino rat.

- To search out the maximum duration of sustainability in the level of rectification of cyproterone acetate induced male reproductive complication after oral administration of lycopene at the potent dose and for threshold duration.
- To explore the actual mechanism of action behind the rectification of cyproterone acetate induced male infertility by unfolding nutrient-gene interaction through genomic pathway.
- To highlight whether there is any direct effect or nongenomic effect of lycopene in connection with rectification of cyproterone acetate treated infertility by performing *in vitro* study.
- To find out the toxic effect lycopene if any after treatment with potent dose for threshold duration.
- To confirm the retrieval of fertility ability of the cyproterone acetate treated infertile male rat after administration of lycopene by conducting mating study.

Ultimate objective of the Ph.D. work is to provide a clue to the pharmaceutical industry to introduce a lycopene based medicine for the management of male infertility after a proper clinical trial.