I. AIMS OF THE STUDY

Vision is one of the most crucial senses in higher vertebrates and perhaps the most important sense for humans. The eye morphogenesis has been studied for a long time and especially in the last two decades to address the function of individual genes duing eye development became one of the most interesting topic.

Although most of our knowledge about the genetic program underlying eye formation comes from vertebrates, valuable new information about eye evolution has recently been obtained by studies of cnidaria. Therefore elucidation of the biological role and function of eye components of jellyfish *Tripedalia cystophora* will enhance our knowledge of specific aspects of both eye evolution and development.

Specific aims of my PhD thesis were as follows:

1. to describe a new crystallin gene in jellyfish *Tripedalia cystophora* with respect to the evolution of its regulatory sequences;
2. to characterize genes required for the assembly of camera-type eyes in jellyfish *Tripedalia cystophora*;
3. to study the role of Wnt/β-catenin during lens induction and formation by employing a new mouse tissue-specific Cre-line;
4. to investigate the functional properties of jellyfish *PaxB* by expressing it in the developing lens and retina of transgenic mice.