Preface

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The cloning of the first gene sequence from the vertebrate eye (cDNA of δ -crystallin of the chick lens) was reported in 1979. In these last 25 years a plethora of eye genes and gene activities have been characterized, some preferentially with recognizable vision phenotypes and others with systemic associations. From these studies, it has become abundantly clear that while the vertebrate eye is a highly specialized tissue, for what it achieves with precision and panache, it is also a highly useful paradigm for almost all processes of interest to the developmental biologist. All the tissues of the eye including the lens, cornea, ciliary body, neuroretina and retinal pigment epithelium must work in harmony for the realization of the phenotype of clear vision. The phenotypic emergence of each of these tissues requires intercellular communication that is achieved through direct physical contact as well as through diffusion and reception of the molecular beacons. A large number of genes and gene products responsible for these interactions are beginning to be cataloged. This volume is a logbook of a journey that seeks to map molecular pathways that lead to morphological emergence of the eye and its functional phenotype, the vision.

The collection of papers here represents a panoramic view of the molecular and cellular biology of eye development encompassing early gene expression in the surface ectoderm and the optic cup, retinal neurogenesis, signaling molecules, axonal guidance and retinal circuitry that

gives rise to 'retinal waves' and ganglion cell structure. This special issue seeks developmental antecedents to vision pathologies such as retinoblastoma, cataractogenesis and form deprivation myopia; examines exclusivity of the photopigment expression in a photoreceptor, presents new ideas on the role of lens in the development of the visual system and challenges the status quo on the morphogenesis of the ciliary body. There is no special emphasis on one nuance or process; each paper paints its own picture on an independent canvas of ideas, opinions and approaches – yet a common thread runs through them, which I hope is revealed to the reader in an informative and exciting fashion. Through all the presentations in this volume the visual system remains true to its historical standing as a paradigm that emphasizes the central role of cellular communication in eukaryotic development. Eye as an archetypical 'window' to the brain remains a relevant cliché, yet the molecular panoply that attends the development of the eye must truly be viewed as a stepping stone into the labyrinth of human consciousness.

I wish to thank all the authors of this volume for their novel contributions – some exploiting established dogma to present new analyses and some challenging the dogma itself. For this privilege, I want to thank Dr. Tony Campagnoni, without whose support this work would have remained only a superb suggestion. My thanks are also due to Michael Marshall in the DN office for his patience with me.