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Sommario/riassunto

A comprehensive guide to current research, reflecting recent technical breakthroughs that have established the usefulness of the mouse model as part of a bilateral exchange between experimental and clinical research. Recent years have seen a burst of studies on the mouse eye and visual system, fueled in large part by the relatively recent ability to produce mice with precisely defined changes in gene sequence. Mouse models have contributed to a wide range of scientific breakthroughs for a number of ocular and neurological diseases and have allowed researchers to address fundamental issues that were difficult to approach with other experimental models. This comprehensive guide to current research captures the first wave of studies in the field, with fifty-nine chapters by leading scholars that demonstrate the usefulness of mouse models as a bridge between experimental and clinical research. The opening chapters introduce the mouse as a species and research model, discussing such topics as the mouse's evolutionary history and the mammalian visual system. Subsequent sections explore more specialized subjects, considering optics, psychophysics, and the visual behaviors of mice; the organization of the adult mouse eye and central visual system; the development of the mouse eye (including comparisons to human development); the development and plasticity of retinal projections and visuotopic maps; mouse models for human eye disease (including glaucoma and cataracts); and the application of advanced genomic technologies (including gene therapy and genetic knockouts) to the mouse visual system. Readers of this unique reference will see that the study of mouse models has already demonstrated real translational prowess in vision research.