Preface

Ocular oncology deals with many different malignancies, both within and around the eye, for which we strive to develop the most effective treatments with a low side effect profile. Cancer treatment in general is trending towards ‘personalized medicine’, i.e. the molecular characteristics of an individual tumor are used to select treatment and to predict both therapy response and the subsequent clinical course. This is often based on data that have arisen from clinical trials. Ocular oncology is faced with a significant problem, namely that eye tumors are relatively rare compared to major malignancies, such as breast, lung and prostate cancer, resulting in it being very difficult to set up clinical trials to determine the efficacy of novel drugs, often requiring multicenter collaboration, which can be time-consuming and expensive. Consequently, our research field more than others remains reliant on preclinical in vitro and in vivo models. The latter are used to investigate the factors involved in malignant transformation, invasion and metastasis as well as to examine responses to therapy. In order to determine whether a drug will be effective against a particular type of ocular tumor, it is initially tested for its efficacy in vitro, followed then by application in an animal model.

A number of animal models are available for ocular tumors, including uveal melanoma, conjunctival melanoma, retinoblastoma and intraocular lymphoma. These animal models include chick embryos, drosophila, zebrafish, mice, rats, rabbits and others and are described in the different papers in this special issue of *Ocular Oncology and Pathology*. Not only can animal models be used to screen drugs (either singularly, in combination or as large panels), they can also be used to determine how the host responds to tumors immunologically or to find out how certain genes or cytokines contribute to tumor growth. Another type of animal model for studying human cancer is through genetic engineering. Knocking in or out a gene in the host mice, drosophila or zebrafish models may reveal how that specific gene contributes (or not) to tumor growth, invasion and spread. Further, one may modify the tumor cells themselves prior to xenotransplantation to determine the effects of particular tumor genotypes. Finally, a significant advance in preclinical models of cancer has been the use of patient-derived xenografts in order to promote the above-mentioned concept of personalized medicine. Each of the models has its limitations and each can only address ‘part of the question’, and so we must be sure to interpret our data within the framework of the limitations of the assay used.

Despite this, significant progress is being made in the field of ocular oncology therapeutics. This special issue provides a range of in-depth reviews of previous and current work undertaken in the field of animal modeling in ocular oncology. Experts in the fields of conjunctival and uveal melanoma, retinoblastoma and lymphoma have provided comprehensive reviews, and we hope the readers will enjoy referring to them as a basis of their research.

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