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The Importance of Accessing Animal Models in Glaucoma Research

Bouhenni R*

Summa Health System, USA

Editorial

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***Corresponding author:** Rachida Bouhenni, Summa Health System, Akron, OH 44304, USA, Tel: (330) 998-9118; E-mail: bouhennir@summahealth.org

Editorial

Developing the ideal animal model of a specific disease remains a goal for every scientist conducting translational research. In glaucoma, the model could be developed either by means of induction or genetic modification in order to mimic the disease. Genetically modified models are preferred for investigating different aspects of the disease, however, development of these models is often costly and beyond the reach of many laboratories. Investigators may prefer to use in vitro cell, tissue and organ culture models [1] as these techniques are extremely powerful and provide important insights into the function of individual cells. However, these types of studies may not accurately reflect how processes occur in the whole body, providing only a fraction of a larger picture, and ultimately may require animal work to achieve the desired results. Computational techniques can also be used. These techniques are another valuable tool for biomedical research. Through application of mathematics, engineering and computational science, mechanisms, diagnosis and treatment of human diseases including glaucoma can be understood. Both computation and in vitro culture models should be used as supplements/supporting evidence to animal model research, and their results should be validated using an animal model. A wide variety of animal models have been used to date in the study of glaucoma. These include both large and small animals such as monkeys, dogs, cats, pigs, rodents and zebrafish (for a full review see reference [2]). Although these models have provided valuable information about some aspects of the disease process, the search for models that address knowledge gaps in specific forms of glaucoma is still warranted due to the heterogeneity of the disease. Additionally, the use of induced models has multiple drawbacks and can only used to study the disease for a short period of time as the phenotype is not sustainable. In primary congenital glaucoma for instance, a transgenic model with a mutation in one of the causative genes [3] is ideal in order to investigate the pathophysiology of the disease which is not completely understood. However, developing such a model requires time, experienced personnel and money. Unfortunately, young investigators and small laboratories lack these resources and therefore their research is limited. Laboratories with accessible resources should strive to share models and those that develop them for a cost should make it affordable to allow young optimistic investigators help advance the field of glaucoma research with fresh ideas. This applies to other research fields also.

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