21 November 2014

Project title	**Novel Vitrectomy cutter Project: Phase II Animal Surgery Study**		
Key words	Ultrasound Vitrectomy technology, Novel Vitrectomy cutter Project		
Expected duration of the project (years)	36 months		
Purpose of the project	Basic research	Yes	
	Translational and applied research	Yes	
	Regulatory use and routine production		No
	Protection of the natural environment in the interests of the health or welfare of humans or animals		No
	Preservation of species		No
	Higher education or training		No
	Forensic enquiries		No
	Maintenance of colonies of genetically altered animals		No
Objectives of the project	The primary outcome of the lab investigation activities is to identify ways to improve the demonstration of the efficacy of different methods of vitrectomy, and to describe their mechanisms of action and their clinical effects.		
Potential benefits likely to derive from this project	This study should provide important information to help us to decide whether the new technology is safe and effective to be tried in a pilot study in-vivo in human eyes.		
Species and approximate numbers of animals expected to be used, and anticipated period of time	20 commercially available pigs will be used over 36 months		
Expected adverse effects and the likely/expected level of severity. What will happen to the animals at the end.	Hyperthermia is a known adverse event related to anaesthesia in pigs. If hyperthermia is apparent the animal will be humanely euthanized. No other adverse events are expected as a consequence of the investigation due to the non-recovery nature of the work.		

Application of the 3 Rs	
1. Replacement Why do animals need to be used, and why non-animal alternatives cannot be used.	The determination of the anatomical changes associated with the use of this novel technology requires the presence of in vivo model as the natural occurrence of changes in the tissues following death. Hence the need for the evaluation of the novel cutter in-vivo and in an animal model. Likewise, It is not ethical to conduct experiments on humans in vitrectomy surgery studies, especially where those experiments require the removal of the eyes for the histopathological investigations.
2. Reduction How the use of minimum numbers of animals will be assured	Previous use of in-vitro methods (flow tests, molecular assessments and histopathological studies) allows us to obtain valued information about this novel technology and it limits the numbers of animals required for the in-vivo investigation stage. The use of High Speed Video Script and surgical records allows a longitudinal assessment of this novel technology. This strategy also reduces the number of animals required in the study. Furthermore, the storage of all of the unused tissue in the histopathological studies at the end of our investigations could allow us to perform further studies without recourse to perform new animal live experiments, being this, another additional way to reduce the number of animals required.
3. Refinement Reasons for the choice of species and why the animal model(s) to be used are the most refined, having regard to the objectives. General measures to be taken to minimise welfare costs (harms) to the animals.	The dimensions and morphology of the porcine eye are similar to those of the human eye. Anatomical and structural differences with the other models. All animals, including controls, will be under GA to reduce or avoid any operative discomfort or painful experience during the vitrectomy procedures. We intend to terminate with the pigs at the end of the surgical procedures. Eye will be removed after death for further studies.