

Vision Science Core Lab

Shared facilities for basic ophthalmic research are located in 500 sq ft of dedicated space in the animal vivarium facility housed in the R&E building subbasement on the Veterans Affairs Medical Center main campus. Multiple procedure rooms provide quiet environmentally controlled areas where lighting can be controlled. Furthermore, the equipment is strategically located in close proximity to the rodent rooms and aquatic facility. Thus, it is not necessary to transport animals away from the vivarium to conduct experiments.

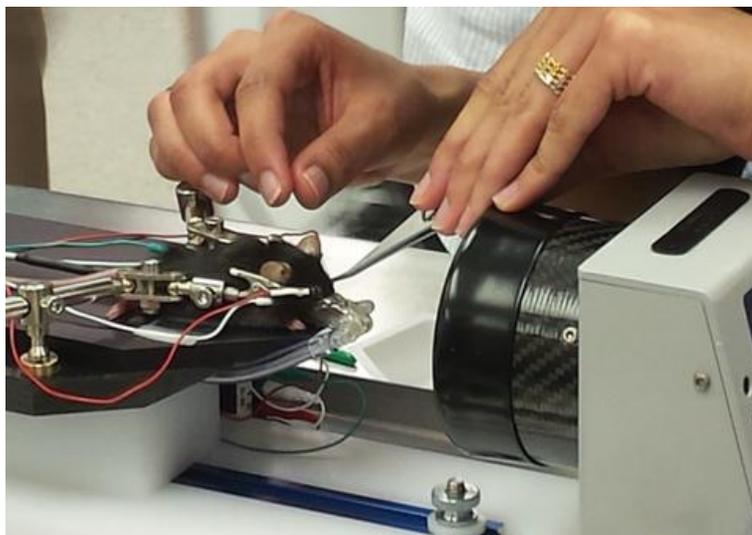


Fig. 1. Anesthetized mouse on temperature controlled warm plate is prepared for ERG measurements.

Electroretinogram (ERG) system

The vision core lab includes electrophysiological instrumentation to obtain electroretinograms (ERGs) from rodents and other small animals. The OcuScience® HMsERG utilizes "protocols" to conduct standardized series of tests as defined by the International Society for Electrophysiology of Vision (ISCEV). The instrumentation can also be programmed to customized protocols for individual research needs (<https://ocuscience.myshopify.com>).

The system is well designed for mouse and rat ERG recordings and can be adapted to other small animals. The system is equipped with a WPI ATC 2000 low noise animal temperature controller, including a specially developed heating plate designed for use with the OcuScience *in-vivo* and *ex-vivo* rodent ERG systems. The Animal Temperature Controller is a low noise heating system for maintaining animal body temperature during experimental procedures. The DC heater is extremely quiet in terms of electromagnetic radiation. This is essential in electrophysiological recordings, which are very sensitive to electromagnetic interference. A compact stainless steel Faraday cage is designed for use with the OcuScience *in-vivo* and *ex-vivo* rodent ERG system. The system is equipped with a calibrated mini-Ganzfeld stimulator for the best illumination of the whole retina. The white on white LEDs produce up to 30 cd.s/m². A convenient sliding track rodent exam table is fitted with articulating arms for electrode positioning as shown in **Fig. 1**, above.

Oxygen controlled environment for retinal neovascularization studies

Oxycycler (<http://www.biospherix.com>) and specialized chamber for small animals are located in the immediate laboratory of the Core Vision Science lab within the VAMC animal vivarium. The equipment was obtained from Biospherix, a leader in oxygen-controlled environments.

The system allows induction of abnormal blood vessel formation in the eye. Conditioning newborn animals with various hyperoxic, hypercapnic exposures, creates rich retinal neovascularization when animals are returned to normal air, and that simulates blood vessel formation seen in Retinopathy of Prematurity.

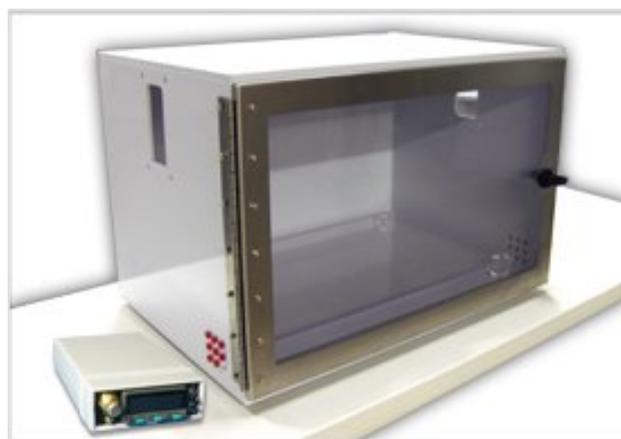


Fig. 2. Biospherix chamber and controller for Chronic exposures to hypoxia, hyperoxia, and hypercapnia can be simulated with ProOx/ProCO₂ controllers.