Retinal Microstructure Imaging (Optical Coherence Tomography)

Version: 1
Replaced by version: N/A
Edited by: David A. Antonetti

(note that the following list should be linked to the appropriate location.)

Summary: A spectral domain ophthalmic imaging system based on the technology of optical coherence tomography (OCT) will be used to acquire the microstructure image of retina in live animals. Like the ultrasound, but uses light waves instead of sound waves, the light backscattered from within a sample is processed to develop a high-resolution, depth-resolved image suitable for analyzing internal microstructure in vivo.

Reagents and Materials:

Reagent/Material	Vendor	Stock Number
Ketamine	Hospira	0409-2051-05
Xylazine	VetOne	510004
Tropicamide Opthalmic Solution 1%	Bausch & Lomb	
Phenylephrine Hydrochloride Ophthalmic Solution 2.5%	Akorn	
Propylene Glycol Eye Drop (Systane)	Alcon	
0.3 c.c. insulin syringe (31-gauge x 5/16”)	Becton Dickinson	328440

Protocol:

1. The eyes of conscious animals are dilated by first applying a small drops (~10 µl) of tropicamide (1%) followed by a small drop of phenylephrine (2.5%) 2 to 3 minutes later
2. Animal is then sedated with ketamine and xylazine
3. After sedation, the corneas are kept moist with the wetting agents (Systane)
4. Animal is then placed on a platform enabling three-dimensional fine movements
5. The camera lens is adjusted to aim at the eye to acquire images without physical contact
6. Volume or radial scan (1.4 x 1.4 mm) is obtained from each eye with a Bioptigen Envisu R2200 preclinical spectral domain optical coherence tomography (SD-OCT) system
7. After imaging procedure, the animal is allowed to recover from the anesthesia
8. Bioptigen Diver software is used to analyze retinal structure from the image obtained