Suprachoroidal Drug Delivery: Unique New Observations

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Gu et al.1 use ultra-high resolution ocular coherence tomography (UHR-OCT) in the guinea pig eye model to evaluate suprachoroidal drug delivery using 10- to 20-μL injections of either saline, indocyanine green (ICG), or triamcinolone acetate (TA).

The authors have an elegantly designed study that measures the cross-sectional area of the suprachoroidal space (SCS) using these various injections at time points from 5 minutes to 24 hours. Injections were delivered using a simple 30-gauge needle on a microsyringe. During the injection, too much volume led to reflux (20 μL). Suprachoroidal expansion was mostly noted near the site of injection with some diffusion into the SCS around the globe. For saline, most of the suprachoroidal volume normalized quickly (30 minutes). During the ICG injection, approximate 50% volume measure in the SCS occurred at around 1 to 2 hours and for TA, at approximately 6 hours with a much slower normalization and thus a potential for sustained delivery. The reported pharmacokinetics are consistent with our prior findings in the large pig model.2 Figure 9 from Gu et al.1 nicely illustrates both ICG and TA injections that are well visualized through transparent sclera as well as from the indirect view from inside the eye (Fig. 10).

In summary, the excellent work by Gu et al. demonstrates sustained suprachoroidal delivery using a simple 30-gauge needle with favorable pharmacokinetics in the SCS via a small molecule suspension of a drug with low solubility (TA) that may have more ideal pharmacokinetic properties for delivery into the SCS. The transparent sclera in this model is truly unique and allows visualization of the drug in the target location. Drug delivery to the SCS is not without risk, and further safety studies are necessary; however, this small animal model nicely demonstrates the potential of suprachoroidal drug delivery.

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References