Loteprednol Encapsulated Nanoparticles in Thermoreversible Gel for Amelioration of Choroidal Neovascularization
A. Hirani \(^1\), A. Grover \(^1\), R. Nimbalkar \(^1\), Y. W. Lee \(^2\), V. Sutariya \(^1\), Y. Pathak \(^1\)
\(^1\) University of South Florida, \(^2\) Virginia Tech

**Purpose**
Choroidal neovascularization (CNV) is the generation of abnormal blood vessels in the choroid layer of the eye; it is a symptom of neovascular age related macular degeneration. Current therapies utilize frequent intravitreal injections which can result in retinal detachment and increased ocular pressure. In the present study, we investigated a sustained drug delivery system to minimize injection frequency and circumvent the related side effects utilizing loteprednol etabonate, poly(ethylene glycol)-ylated (PEGylated) poly-(lactide-co-glycolide) (PLGA) nanoparticles (NPs), and a PLGA-PEG-PLGA thermoreversible gel.

**Methods**
The loteprednol-loaded NPs were prepared using the nanoprecipitation method. The loteprednol NPs were then incorporated into a 20\% (w/v) thermoreversible gel prepared using the cold method.

**Results**
Characterization data showed an average particle size of 168.60 ± 23.18 nm, polydispersity index of 0.0142 ± 0.0023 nm, and encapsulation efficiency of 82.6\%. MTT cytotoxicity data showed that the drug delivery system had no effect on cell viability in human retinal pigment epithelial cells (ARPE-19) after 24 hour exposure. Preliminary in vitro release results demonstrated a 5.48\% release of free loteprednol and 3.08\% from the drug delivery system after 24 hours.

**Conclusion**
The proposed delivery system for loteprednol could be an effective sustained release treatment for ocular dysfunction.