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Abstract Title: **In vivo Imaging of mCMV Infection in the Eye**

**Purpose:** To develop a technique by which murine cytomegalovirus (mCMV) can be tracked and monitored in various ocular compartments in vivo, and to investigate the dynamics and kinetics of ocular mCMV infection.

**Methods:** The development of a recombinant mCMV tagged with enhanced green fluorescent protein (eGFP-MCMV) has made in vivo imaging of this pathogen feasible. Immunocompetent BALB/c mice were infected intravitreally with eGFP-MCMV. On sequential days after inoculation, infection in the eye was monitored with a Heidelberg retinal angiograph (HRA). Eyes were also processed for histology and immunofluorescence microscopy to determine the nature of infected cells in various ocular compartments. At indicated times after infection, FACS analysis was performed to investigate recruitment of T cells into the retina.

**Results:** Green fluorescent signal appeared 24 hours after intraocular injection, with scattered foci visible around the posterior pole of the retina. eGFP levels in the retina reached a maximum between days 6 and 12, and signal was commonly found to accumulate around the optic nerve head. At day 25 the signal became weaker, suggesting a decrease in the frequency of infected cells in the retina. Signal in the iris was observed from day 4 and lasted up to day 50, with signal commonly seen on the anterior curvature of the lens. FACS analysis of retinal tissue showed a recruitment of both CD8+ and CD4+ T cells from day 6 post infection. Tetramer analysis revealed a high frequency of antigen-specific CD8+ T cells accumulating in the retina on day 12.

**Conclusion:** The ability to noninvasively monitor infectious agents in the eye may improve our knowledge of the course and pathogenesis of intraocular infections and could lead to further clarification of the mechanisms by which the immune system responds to intra-ocular pathogens.

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