Cellular Uptake of Optical Viral Ghosts by Human Spleen Macrophages and Hepatocytes in-vitro

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Summary: We have investigated the interaction of optical virus-like nanoparticles with cells of the reticuloendothelial system in-vitro.

In a recent publication we demonstrated the ability to encapsulate Indocyanine Green (ICG) a near-infrared dye within genome-depleted brome mosaic virus (BMV)[1]. We refer to the nano-constructs which resemble other virus-like particles as optical-viral-ghosts (OVGs). We have demonstrated their physical and optical absorption stability at physiological temperature. Using human bronchial epithelial (HBE) cells we also demonstrated the effectiveness of OVGs for intracellular optical imaging in vitro. In this study we aim to investigate the interaction between OVGs, and hepatocytes and spleen macrophages in-vitro. These cells are important cells of the reticularendothelial system (RES), involved in clearance of foreign particles from the body.

Our preliminary data show greatly reduced uptake of OVGs by the spleen macrophages, as evidenced by the minimal fluorescent signal (Fig.1). We employ confocal fluorescent microscopy and flow cytometry to characterize the interaction of these cells with PEGylated and non-PEGylated OVGs[2]. Results of these studies provide relevant information to the expected clearance of OVGs by RES in-vivo.

Fig. 1. Bright-field(a, b) and the corresponding transmission fluorescent images (c, d) of macrophages at a density of 15K cells. Panels a and c correspond to cells incubated for 180mins with free ICG. Panels b and d correspond to cells incubated for 180 mins with OVGs. Total amount of ICG added to each well was .2µg.