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Title: Targeted dual-mode imaging and phototherapy of tumors using ICG-loaded multifunctional MWCNTs as a versatile platform

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Summary: Current research is trending towards translational applicability as fast as possible. To this end, some researchers have focused on using clinically approved fluorescent agents, such as Indocyanine Green (ICG). ICG is unique in that it can be used both as a diagnostic agent and as a photosensitive agent for therapeutic applications and is ideally suited for theranostics research. The free ICG form has limitations in that it degrades quickly in aqueous media, is susceptible to photobleaching, binds quickly to proteins in the blood, and is quickly removed from systemic circulation. An approach to make ICG last longer in the body, and thereby maximize its theranostic potential, is to bind it to organic or inorganic compounds. Researchers have tried to focus on combining free ICG with multi-walled carbon nanotubes (MWCNTs), due to its large surface, ultralight weight properties, strong chemical and thermal stability, and its inherent ability to cross cell membranes which make it an attractive option for many theranostic applications. In this study, the researchers used the InSyTe FLECT to assess accumulation of ICG loaded-MWCNTs in a xenograft HeLa tumor model.

InSyTe FLECT/CT Spotlight: Using the InSyTe FLECT, the research team was able to visualize localization of the ICG loaded MWCNT probe *in vivo* at 1 hour post injection. The research team demonstrated that the folic acid targeting ability of the ICG loaded MWCNTs facilitated delivery of the loaded ICG into the tumors, showing the potential of the custom synthesized MWCNT for drug delivery applications.



Fluorescence images captured by the InSyTe FLECT on the xenograft tumor model. Group 1 mice were pre-treated with folic acid prior to injection of the ICG loaded MWCNTs. Group 2 mice were injected with the ICG loaded MWCNTs only. Using FLECT, the research team was able to assess the performance of the folic acid targeting ICG loaded MWCNT probes.