CONCENTRATION EFFECT ON THE METABOLIC-RATE EVALUATION OF INTRAVENOUS APPLIED ICG  
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ABSTRACT  
Hepatocellular carcinoma (HCC) in men is the fifth most frequently diagnosed cancer in the world, and is the second leading cause of cancer-related death worldwide. To develop a fast, precise, and safe way for the evaluation of hepatic function will play a critical role in accurate preoperative assessment of hepatectomy. The conventional way requires to take a draw of blood, which is inconvenient and invasive. In the past 25 years, the pulse dye-densitometry method has been developed which is able to assess liver function non-invasively by measuring the ICG absorption [1]. However, this method is not accurate enough due to the background signals caused by the tissue, so another background-free fluorescence-based method has been developed [2]. In our spectrum experiment, we found that the ICG fluorescence is non-linear at the high concentration, which will lead to inaccuracy in the fluorescence-based method (Figure 1). Consequently, we consider that it is more safe, more accurate, and more cost-effective to conduct the fluorescence-based method at a low dose of ICG (below 0.05 mg/kg).  

![Figure 1](image_url)

Figure 1. The relation between the ICG concentration and the ICG fluorescence intensity. (a) Comparison between single-photon and two-photon fluorescence. The physiologic ICG dose (0.5 mg/kg) is marked by the dash line. (b)(c) Both of the single-photon and two-photon fluorescence intensity is relatively linear to the concentration at a low dose of ICG (below 0.05 mg/kg).  