DIAGNOSE LIVER FUNCTION IN VIVO WITH TWO-PHOTON FLUORESCENCE OF 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 [1]. To develop new ways for the evaluation of hepatic function will play a critical role in accurate diagnosis and guiding future disease prevention strategies. We established HCC rat model with diethylnitrosamine (DEN) [2] and real-time investigate the fluorescent images and decay curves of indocyanine green (ICG) in the rat ear model through in vivo nonlinear optical microscopy. We demonstrated that our noninvasive nonlinear optical investigation can diagnose liver function as precise as the traditional invasive ICG retention test [3]. This new noninvasive continuous measurement way can avoid the underestimation of retention rate and provide the accurate diagnosis.

Figure 1. The fluorescent images and decay curves of non-tumor and HCC rat models which were injected with ICG via tail-vein catheterization. (a) Combined ICG two-photon fluorescence (green) and third harmonic generation (magenta) real-time images of non-tumor rat. (b) The ICG fluorescent decay curve of non-tumor rat. (c) The ICG fluorescent decay curve of HCC rat.