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# Imaging Hepatocellular Carcinoma using Positron Emission Tomography

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**Abstract**

Hepatocellular carcinoma (HCC) is the fifth most common tumor and the third most common cause of cancer death worldwide with a dismal survival rate< 3 month. Positron emission tomography (PET) played a minor role in HCC imaging so far largely due to the fact that the commonly used radiotracer, 2-[$^{18}$F]-2-deoxy-D-glucose (FDG) has little uptake in a number of HCC cases leading to a high false positive rate. In addition, the cost associated with a PET scan prevented it from becoming surveillance or screening tool. Several existing small molecule PET tracers, which were initially developed for other studies, have shown uptake in HCC. These include [$^{11}$C]-acetate, [$^{11}$C]-methionine, [$^{11}$C]-choline as well as [$^{18}$F]-labeled fluorinated choline analogs. For each of these tracers, the uptake mechanisms were studied extensively with an animal model of hepatitis viral infection induced HCC for correlation with preliminary clinical PET scans of HCC using the same tracer if performed. However, the full clinical utility of each tracer needs to be further investigated through patient studies to determine if any of them is useful for early detection, staging, and/or treatment evaluation. The promising PET tracers such as 3'-deoxy-3'-fluorothymidine (FLT) or 2'-[$^{18}$F]fluoro-5-methyl-l-P-Darabinofuranosyluracil (FMAU), both thymidine analogs designed for imaging tumor proliferation, may not be suitable for imaging HCC due to their degradation in the liver.

**Biography**

Yu Kuang received his B.Eng. and M.S. in Biomedical Engineering from Zhejiang University, Hangzhou, China, in 1997 and 2004, respectively, and Ph.D. in Biomedical Engineering from Case Western Reserve University, Cleveland, OH in 2009. He was a Research Fellow in the Department of Radiology at University of Michigan Hospital in 2010. And then he continued his radiation therapy physics clinical and postdoctoral research training in the Radiation Physics Division of Department of Radiation Oncology at Stanford University School of Medicine until 2012. Currently, he is a Lincy Endowed Assistant Professor in the Medical Physics Program at the University of Nevada, Las Vegas (UNLV). Dr. Kuang is an Editor-in-Chief of Journal of Nuclear Medicine & Radiation Therapy (OMICS Publishing Group). Recently, he has received two "Best in Physics" (BIP) awards (one for imaging track, the other for joint imaging-therapy track) in 2012 American Association of Physicists in Medicine (AAPM) annual meeting. BIPs were the scored highest in the blind abstract review process and were judged to reflect "the highest level of scientific quality and innovation". Meanwhile, he also received a Basic Science Abstract Award – Radiation Physics Category in 2012 American Society of Radiation Oncology (ASTRO) annual meeting, and a travel award in 2012 World Molecular Imaging Congress in Dublin, Ireland. He has a long standing research interest in the development and translation of novel imaging and therapeutic techniques utilizing ionizing radiation