

# International Conference and Exhibition on **Molecular Medicine and Diagnostics** August 24-26, 2015 London, UK

## Optical bio-imaging for detecting metastatic cancer-specific enzyme activity

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**B**iological optical imaging in the NIR window includes strategies for diagnostic imaging of solid tumors, separation from auto-fluorescence enabling higher signal-to background ration and increased penetration into tissue than visible light. The use of NIR fluorescent cyanine dyes (Cy7) has desirable NIR optical properties and we developed a near-infrared (NIR) in vivo imaging probe for simultaneous metastatic tumor targeting and fluorescence imaging. The metastatic cell phenotype was considered as essential information in multiple tumor types. Among the many extracellular proteases, membrane-type matrix metalloproteinase 1 (MT1-MMP) is considered key promoters in extracellular matrix (ECM)-degrading membrane protrusions of cancer cells. Therefore, the sensitive imaging of proteolytic enzyme activity and presence is important for prediction of the metastatic ability cancer cells. In this study, a fluorogenic sensing probe was fabricated by conjugation of Cy7 modified MT1-MMP specific cleavable peptides with gold nano rods (GNRs). GNR provide a versatile method for NIR photo-absorption and nano-particle surface energy transfer (NSET). We have demonstrated metastatic tumor selectivity of NIR optical imaging probes based on proteolytic activity of MT1-MMP in vitro and in vivo. We conclude the potential benefits of NIR optical imaging probe for studying metastatic properties by tumor detection, biomarker visualization and molecular activity.

### Biography

Minhee Ku is pursuing Doctoral course at Brain Korea 21 Plus Project for Medical Science, Yonsei University. Simultaneously, she's studying metastatic potential of cancer based on enzymatic activity.

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