

Wide-field quantitative phase imaging for tissue and its disease model
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ABSTRACT

We present a label-free wide field phase imaging technique, which can replace the histological imaging. We have acquired phase-delay tissue image of different type of major organ from mice. Not only healthy tissue, but also we were able to have image of disease model such as acute kidney injury (AKI). AKI study has mainly conducted by histology, immunohistochemistry and western blot, which only provide qualitative analysis.

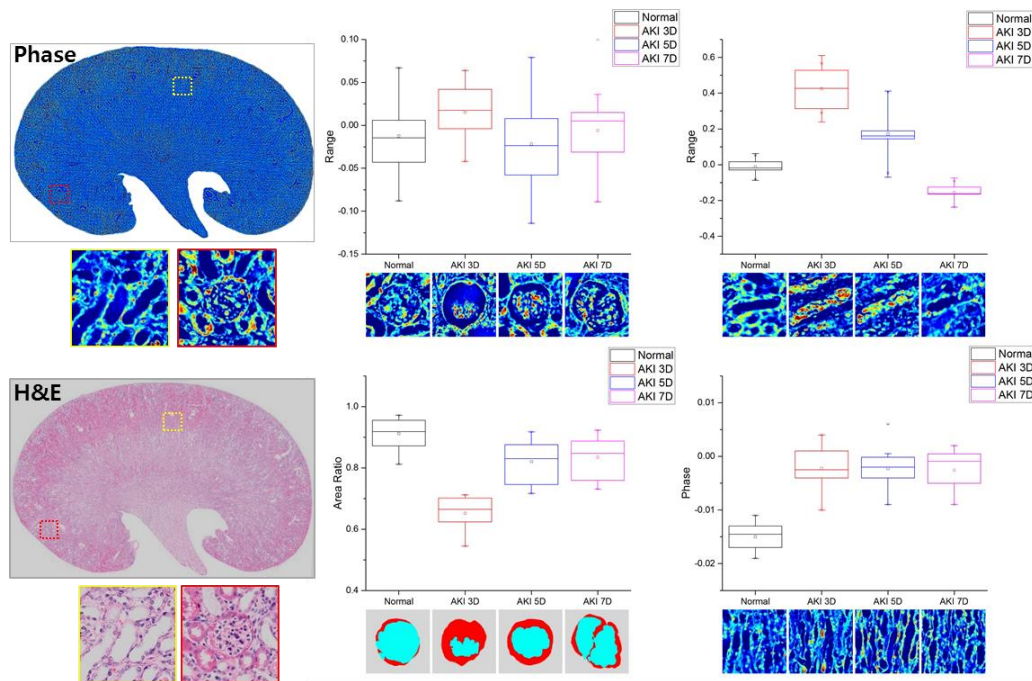


Figure 1: Measurement of the phase delay in healthy kidney and AKI model

For better understanding of kidney structure in AKI, we present a new approach using digital holography combined with wide-field scanning platform. Through the phase-delay information from the disease model, we were able to predict a stage of AKI based on distinct optical property such as scattering parameter and anisotropy. These retrieved optical parameters quantitatively demonstrate the healing process of AKI model of kidney with high contrast as well as its detailed anatomical structure.

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