Title: The mechanism and intervention of acute renal injury
Application deadline: Applications accepted all year round
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Summary (max 200 words)

Acute kidney injury (AKI) has high mortality with 13 million incidences globally contributing to 1.7 million deaths every year. AKI could also progress to chronic kidney disease (CKD). The ischemia/reperfusion injury (IRI) is one of the main courses of AKI. The mechanism of AKI has not been fully understood and there is lack of effective diagnosis and treatment apart from costly replacement therapy.

We demonstrated up-regulated caspase-3 associated with apoptosis and inflammation involved in AKI, whereas small interfering RNA (siRNA) targeting caspase-3 protected tubular cells/kidneys. Latterly, we also showed a novel erythropoietin derived peptide (HBSP or CHBP) without erythropoiesis improved AKI via inhibiting caspase-3, apoptosis and inflammation. In addition, modern technologies such as microarray enable simultaneously investigating hundreds of thousands of genes. We have evaluated gene expression profile in human renal biopsies and subsequently developed an analytic regime.

In this proposed PhD project, renal IRI animal models and relevant cell culture models will be used to explore multiple pathways involved in AKI, focusing on immunity, inflammation, autophagy, apoptosis and fibrosis. Most importantly, new combinational biomarkers, as well as interventions such as using caspase-3 siRNA-HBSP conjugate will be defined and validated for timely diagnosis and precise personal treatment for AKI in order to prevent CKD.