

## Jian-Ying Huang

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**Mentor:** Dr. Han-Gang Yu

**Title:** Receptor Protein Tyrosine Phosphatases on Hyperpolarization-activated Cyclic Nucleotide-gated Channels

### **Project Summary:**

The long-term goal of my research is to understand the mechanism of cardiac arrhythmias. This pre-doctoral fellowship application concentrates on investigation of the novel role protein tyrosine dephosphorylation induced by Receptor-like Protein Tyrosine Phosphatase  $\mu$ , RPTP $\mu$ , may play in the modulation of the hyperpolarization-activated cyclic nucleotide-gated HCN2 cardiac pacemaker channels.

Employing a combination of protein biochemistry, fluorescent confocal microscopy, and whole-cell patch clamp techniques, I will investigate 1) the expression patterns of RPTP $\mu$  in pacing and non-pacing cardiac tissues, and 2) the modulation by RPTP $\mu$  of HCN2 channels.

Mammalian cell lines (HEK293) and rat adult/neonatal ventricles/ventricular myocytes will be used to investigate the mechanisms by which RPTP $\mu$  uses to modulate HCN2 channels. Atrial fibrillation and ventricular arrhythmias are among the most common and lethal arrhythmias in patients with heart diseases. The HCN encoding cardiac pacemaker current,  $I(f)$ , is an important contributor to the regulation of cardiac pacemaker activity. Understanding the modulation of HCN channels should have significant diagnostic and therapeutic implications.