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A clinically relevant peripheral nociception stimulus elicits remote non-ischemic cardioprotection

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Abstract

Introduction: Our previous studies have identified a novel cardioprotective phenomenon that occurs subsequent to remote trauma (abdominal skin incision), termed RPCT and initiated by a neurogenic ganglionic mechanism. Reasoning that low-trauma non-ischemic remote cardioprotection could have important clinical application, we tested the hypothesis that remote electrical stimulation (ES) of skin nociceptors can reproduce this effect similar to that of RPCT. methods, an in vivo mouse I/R model were used. ES was performed 15 minutes prior to I/R or at the beginning of reperfusion. Infarct size was used to evaluate the results of I/R injury (45 min coronary occlusion, 24h reperfusion) with or without prior ES treatments. Histological, functional and biochemical studies were determined at appropriate time points. The results of our studies demonstrate that nociceptor stimulation at specific points does indeed induce a powerful 85% ($P<0.01$) reduction in infarct size and reduces post-ischemic ventricular dysfunction. Both the number of TUNEL-positive nuclei and DNA fragmentation were significantly reduced in the ES treated group. Cardioprotective effect of ES was abolished by both Beta-AR antagonism and in BK2RKO mice. Western blot results show PKC isoform translocation is altered after ES and pharmacologic blockade of PKC prevented cardioprotection due to ES. In conclusion, our results support 1) ES elicited a powerful cardioprotection via a neural mechanism, 2) the protective effect of ES against MI involves Beta-AR, BK2R signaling and PKC modulation.

Biography

Xiaoping Ren received his M.D in Harbin Medical University in 1984. He performed his Clinical and Research Hand Fellowship training in University of Louisville in Kentucky (1996-2000). During the period, Dr. Ren created a feasibility large animal CTA model for limb transplantation to allow modulation of the immune reaction and to investigate immunosuppressant. The Nation's First Hand Transplantation in US was successfully conducted as a direct result of the preclinical swine composite tissue allotransplantation model (CTA). He joined the University of Cincinnati College of Medicine as faculty member in 2001, then appointed Assistant professor and Associate Professor and holding position as Professor/Director in HMU since 2012.

As well as CTA, another focus of his research program is to understand molecular and neuronal basis of non-ischemic nociceptor-induced cardioprotection. In UC. These studies were published in the *Journal of Surgical Research* and in *Circulation*. Dr. Ren has had over 40 publications in peer-reviewed journals. Currently, he is holding active Memberships of the American Association for Hand Surgery and the American Heart Association. He also service as peer-reviewer of several journals.