Thambi Dorai et al., Adv Surg Res 2019, Volume 3

INDUCTION OF HYPOMETABOLISM AS A STRATEGY TO MINIMIZE RENAL ISCHEMIA AND TO ENHANCE TRANSPLANT TOLERANCE

Thambi Dorai, Bobby Alexander, Andrew Fishman and **Michael Grasso**
New York Medical College, USA

For many mammals, survival during winter months is a formidable challenge because of severe cold environmental temperatures and very limited food availability. As part of their survival strategy, hibernating animals (i.e. bears, ground squirrels) endure winter by hibernating. Hibernation is an altered physiological state which is marked by a characteristic lowering of body temperature and extreme metabolic rate depression. During this period, their heart rate and blood flow may decrease to 1/30 and their oxygen consumption to 1/100 of their respective euthermic levels. Even though these physiological parameters mimic conditions of ischemia, their organs, particularly their brain, heart, liver and kidneys do not show any detrimental effects of severely reduced blood flow when these animals come out of hibernation. These adaptation as well as pre-conditioning mechanisms has been the subject of intense studies in recent years. Several novel strategies to induce a hibernation-like state in non-hibernator model systems like mice have been reported. Author investigated the pre-conditioning effect of administering 5'-Adenosyl Monophosphate (5'-AMP) to mice to create a state of hypometabolism. This hibernation-like state is used to study its protective effect on a subsequent renal ischemic episode. The results show that inducing a hypometabolic state in non-hibernators such as mice can be used as a novel strategy to reduce the severity of renal ischemic damage as measured by several accepted parameters. Perfecting this technique of creating a hibernation-like state in higher animals and in man may pave the way to increase the warm ischemia time in renal reconstruction and transplantation surgeries while at the same time preserving global renal function.

BIOGRAPHY

Thambi Dorai is currently working as a Research Professor at the Urology, Biochemistry and Molecular Biology Departments of the New York Medical College, New York. Research interests include molecular mechanisms of urological malignancies such as prostate, kidney and bladder cancers and the role metabolism plays in cancer progression and metastasis and cancer specific signaling pathways. Other research projects include the metabolic pathways that are deranged in sepsis, renal ischemia and metabolic manipulation strategies to enhance transplantation tolerance by educating macrophages and reducing their inflammatory signaling. Such molecular approaches would be beneficial in renal and other reconstruction surgeries in the future.

thambi_dorai@nymc.edu

Note: