

Muscle Regeneration from Finish to Start, and Back...

Prof. Judy E. Anderson

Department of Biological Sciences

The University of Manitoba in Winnipeg, Canada

The growth of skeletal muscle and its regeneration from disease or injury require the activation of stem cells in order to form new muscle. This process is also coordinated with regeneration of non-contractile tissues such as connective and vascular tissues. We discovered that the nitric oxide (NO) that is released from muscle NOS-1, is a potent activating signal for muscle stem cells (called satellite cells) (Anderson, *Molec Biol Cell* 2000). Based on that discovery, we developed MyoNovin (Wang et al., *Molec Pharmaceutics* 2009). The drug is a new “NO-donor” formulation; it and other NO-donor drugs are now being tested for cell-based tissue responses in skeletal muscle in normal, diseased and aging animals. The formulation of MyoNovin aims to direct nitric oxide to skeletal muscle. It activates satellite cells and increases the potential for coordinated regeneration and for muscle growth or its resistance to age-related atrophy. Fish muscle satellite cells also respond to NO-donor treatment in culture. An approach using NO to modulate stem cell activity could benefit humans in treatment of muscular dystrophy and sarcopenia and improve rehabilitation, and also have potential to support increased muscle growth in animals for food production.