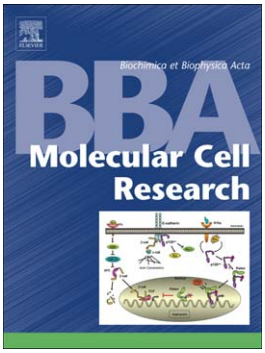

The neonate versus adult mammalian immune system in cardiac repair and regeneration

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The neonate versus adult mammalian immune system in cardiac repair and regeneration.

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Abstract

The immune system is a crucial player in tissue homeostasis and wound healing. A sophisticated cascade of events triggered upon injury ensures protection from infection and initiates and orchestrates healing. While the neonatal mammal can readily regenerate damaged tissues, adult regenerative capacity is limited to specific tissue types, and in organs such as the heart, adult wound healing results in fibrotic repair and loss of function. Growing evidence suggests that the immune system greatly influences the balance between regeneration and fibrotic repair. The neonate mammalian immune system has impaired pro-inflammatory function, is prone to T-helper type 2 responses and has an immature adaptive immune system skewed towards regulatory T cells. While these characteristics make infants susceptible to infection and prone to allergies, it may also provide an immunological environment permissive of regeneration.

In this review we will give a comprehensive overview of the immune cells involved in healing and regeneration of the heart and explore differences between the adult and neonate immune system that may explain differences in regenerative ability.