Innovative Immunotherapy for Cardiac Regeneration after Myocardial Infarction

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Overview

Myocardial infarction (MI), commonly known as a heart attack, is a leading cause of death worldwide, with no available therapies for restoring heart function post-MI. Prof. Tzahor and his team made a significant breakthrough by discovering that the administration of the chemokine CCL24 to infarcted hearts facilitates cardiac regeneration.

Background and Unmet Need

Cardiovascular diseases claim millions of lives annually, with MI and strokes accounting for the majority of deaths. Survivors of MI suffer from irreversible heart damage, impacting their quality of life and increasing the risk of recurrent infarctions or further complications. The lack of effective therapies to restore heart function after MI highlights a critical unmet clinical need.

The Solution

Prof. Tzahorâ€™s team found that administering CCL24 to infarcted hearts promotes cardiac regeneration, offering hope for post-MI recovery.

Technology Essence

An effective immune response after MI is crucial for repairing cardiac damage and can coordinate pro-regenerative efforts from the other major cardiac cell types. Although the immune system is necessary for cardiac repair, prolonged inflammation exacerbates scarring, underscoring the importance of transient inflammation signals as a potential MI repair mechanism. The Tzahor lab discovered that a specific population of resident cardiac macrophages with a cardio-protective role express CCL24, a chemokine that induces angiogenesis and modulates the immune response. Direct administration of CCL24 peptide just after MI improves key functional cardiac parameters, reduces scar size, and facilitates angiogenesis (Figure 1), thereby enhancing cardiac repair after MI injury.

Applications and Advantages

- Promising angiogenic immunotherapy for the treatment of acute MI
- Induces heart tissue regeneration, potentially reducing the risk of recurrent episodes
- Can be applied through direct injection of CCL24 peptide/nucleic acids encoding Ccl24

Development Status

The team has demonstrated the efficacy of CCL24 application in promoting cardiac regeneration in a mouse model of MI.

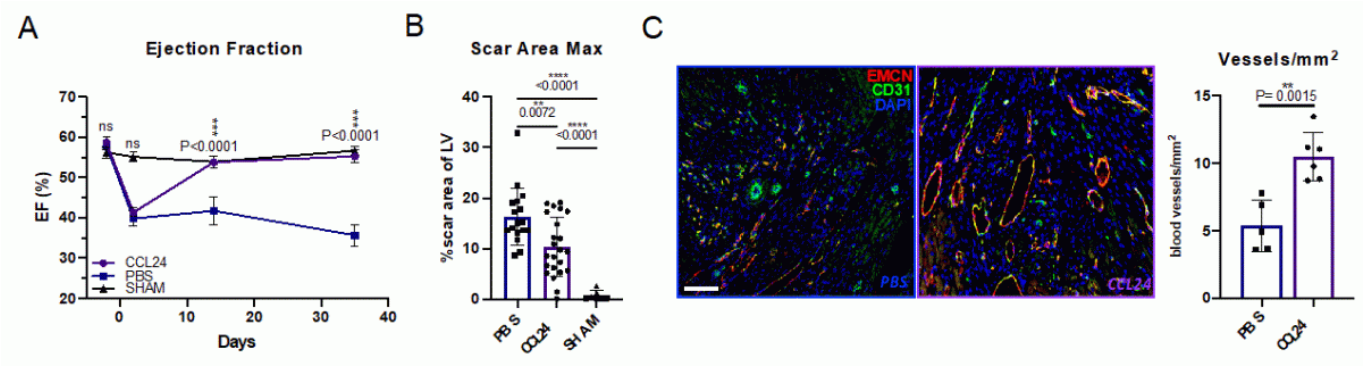

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Fig1. CCL24 administration post-MI facilities cardiac regeneration by function (A), histological (B), and angiogenic measurements (C).

Patent Status

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