

Immunomodulatory compounds for preventing delayed healing in patients with a musculoskeletal injury

Ref. No.: CH833

Background

Musculoskeletal injuries are often the result from accidents and encompass bone fractures, torn or otherwise damaged muscles or ruptured tendons. In Germany, the number of bone fracture incidents is estimated to be 1.6 million per year. Delayed or incomplete bone fracture healing is observed in approximately 5-10% of patients following a fracture of the long bones. In normal healing patients, the regenerative process starts with an initial inflammatory phase in which immune cells invade in the fracture site and accessory cells are recruited, which is displaced by an anti-inflammatory phase after 24-36 hours after injury. A prolonged pro-inflammatory reaction due to a lack or damped anti-inflammatory phase negatively impact the healing process and is assumed to be the cause for delayed fracture healing.

Technology

We offer the use of Iloprost (or another prostacyclin analogue) as an anti-inflammatory agent for the treatment of a patient with a musculoskeletal injury and with risk for delayed bone/ muscle healing, wherein the first initial dose is administered or released not before 24 hours after musculoskeletal injury (best between 3 to 4 days after injury). Iloprost can be infused via a catheter which has been inserted locally in the fracture site during surgery or alternatively, can be injected or administered via an implant. By administering Iloprost, the prolonged pro-inflammatory phase in delayed healing patients can be stopped timely and anti-inflammatory processes can be supported. In an osteotomy mouse model (fracture performed on the left femur), a gel-based release system containing Iloprost, Fibrinogen and Thrombin-S solution was applied in the fracture region. Iloprost-release-system treated mice showed a better femur fracture healing 21 days after fracture than control mice which received only the release system.

Benefits

- ✓ Novel therapeutic approach for preventing delayed bone or muscle healing in risk patients with musculoskeletal injuries
- ✓ Multiple effects: i) decrease of CD8+ T-cell-mediated secretion of TNF α and IFN γ ; ii) positive effect on new bone formation *in vivo* (mouse model)

Application

Prevention or treatment of delayed bone fracture / muscle healing

Commercial Opportunity

Searching for a licensing or developing partner

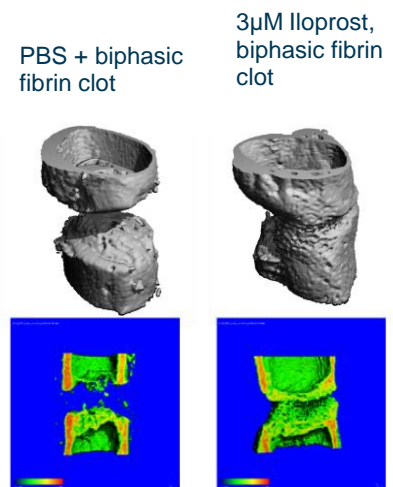


Fig. 1: Healing outcome 21 days post-osteotomy in a mouse osteotomy model (femur) – Effect of Iloprost on newly formed bone volume. 3D-Reconstruction of the micro-CT measurement. Color indicates the mineralization state, increasing from blue to red.

Key words

Iloprost, Prostacyclin, musculoskeletal injury, delayed bone healing, delayed muscle healing, release system, immunomodulation

Developmental Status

In vivo, Lead optimization

IP Status

EP patent application (08/2017)
PCT patent application (08/2018)

Patent Owner

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