Therapeutic application of alphaB-crystallin promotes recovery from peripheral nerve injury

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Background
Damage to peripheral nerves often lead to dysfunction of hands, arms and legs because nerve fibers do not regrow completely in humans. Despite being a common injury, current treatment options rely on surgical anastomosis or nerve engraftment often leading to non-optimal outcomes. Moreover, adequate time for a surgery is often missed as surgical treatment decisions are made later after an initial diagnosis of the injury. An effective treatment option is needed for peripheral nerve injury as delayed surgical repair can result in only partial nerve regeneration.

AlphaB-crystallin (HSPB5/CRYAB/αBC) is a small heat shock protein that enhances survival in response to stress by inhibiting protein aggregation, reducing levels of intracellular reactive oxygen species and inhibiting programmed cell death. αBC is constitutively expressed by the peripheral nervous system (PNS) axons and Schwann cells. The inventors discovered that loss of the crystallin impaired conduction velocity as well as motor and sensory functions were likely related to deficits in remyelination. Intravenous injections of recombinant human αBC promoted remyelination and functional recovery in wild-type mice following a sciatic nerve crush injury revealing a therapeutic effect of αBC.

Areas of Application
Therapeutic treatment for peripheral nerve damage.
Therapeutic could be administered:
• immediately post-injury
• at time of surgery
• intravenously
• at site of injury using αBC-infused biodegradable gels or nerve connectors

Competitive Advantages
There are currently no therapeutic treatments for peripheral nerve injury. Current standard of care is surgical treatment which does not solve the issue of incomplete regeneration of damaged PNS axons in humans. The use of αBC has been proven to be safe in humans.
Stage of Development
Pre-clinical data from mouse demonstrating a therapeutic effect of αBC following a sciatic nerve crush injury. Phase 1 and 2a trials in multiple sclerosis patients demonstrate that alphaB-crystallin is safe in humans1.

Intellectual Property Status
Patent pending

Publications