Regenerative rehabilitation promises to enhance the potential of cell- and gene-based techniques by incorporating principles of physical therapy.

One approach involves exercising the recipient following regenerative treatment. Young mice that are run on a treadmill following the transplantation of muscle-derived stem cells, for example, developed more new muscle cells and had improved strength than sedentary controls. Because not everyone is able to undergo such physical exertion, scientists are also testing whether giving cells a mechanical workout in the lab prior to transplantation offers the same kinds of benefits. By stretching mesenchymal stem cells in vitro before injecting them into old mice, researchers have elicited improvements in muscle growth and strength similar to those seen in young mice.

Muscle stem cells

Large blood vessels

Greater blood flow

Myofiber growth

© KIMBERLY BATTISTA