

Stem cells could halt osteoporosis, promote bone growth

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While interferon gamma sounds like an outer space weapon, it's actually a hormone produced by our own bodies, and it holds great promise to repair bones affected by osteoporosis. In a new study published in the journal *Stem Cells*, researchers from the Research Institute of the McGill University Health Centre explain that tweaking a certain group of multipotent stem cells (called mesenchymal stem cells) with interferon (IFN) gamma may promote bone growth.

"We have identified a new pathway, centered on IFN gamma, that controls the bone remodelling process both in-vivo and in-vitro," explains Dr. Kremer, the study's lead author and co-director of the Musculoskeletal Axis of the McGill University Health Centre. "More studies are required to describe it more precisely, but we are hopeful that it could lead to a better understanding of the underlying causes of osteoporosis, as well as to innovative treatments."

The next step was to move to an animal model where IFN gamma effect is blocked by inactivating its receptor, a model called IFN gamma receptor knock-out. Bone density tests, comparable to those used to diagnose people with osteoporosis, were conducted. The results revealed that these animals have significantly lower bone mass than their healthy counterparts. In addition, their mesenchymal stem cells have a decreased ability to make bone. "These findings confirm that IFN gamma is an integral factor for mesenchymal stem cells' differentiation into osteoblasts also in-vivo," says Dr. Kremer.

Until now, IFN gamma has been mostly used as an agent to prevent infections and to reinforce the immune system from illnesses such as cancer. These findings provide hope that IFN gamma itself, or another molecule involved in its pathway, could soon also become an efficient drug-target for an antidote for osteoporosis.

More information: "Autocrine Regulation of Interferon γ in Mesenchymal Stem Cells Plays a Role in Early Osteoblastogenesis," published in the journal *Stem Cells*, was authored by Richard Kremer of the McGill University Health Centre, Gustavo Duque, Dao Chao Huang, Michael Macoritto, Xian Fang Yang of the McGill University Faculty of Medicine and Centre for Bone and Periodontal Research and Daniel Rivas of the McGill-affiliated Lady Davis Institute for Medical Research.

Source: McGill University Health Centre

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