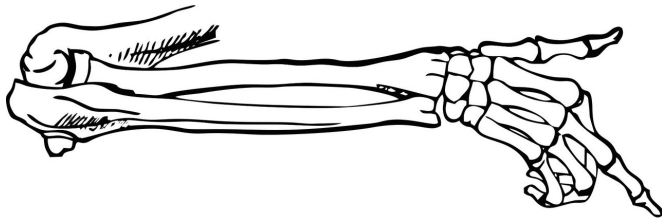


# After a bone injury, shape-shifting cells rush to the rescue

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Conventional thinking is that bone regeneration is left to a small number of mighty cells called skeletal stem cells, which reside within larger groups of bone marrow stromal cells.

But new findings from the University of Michigan recasts that thinking.

In a recent study, Noriaki Ono, assistant professor at the U-M School of Dentistry, and colleagues report that mature [bone marrow](#) stromal cells metamorphosed to perform in ways similar to their bone-healing stem cell cousins—but only after an injury.

Bone fracture is an emergency for humans and all vertebrates, so the sooner cells start the business of healing damaged bone—and the more cells there are to do it—the better.

"Our study shows that other cells besides skeletal stem cells can do this job as well," Ono said.

In the mouse study, inert Cxcl12 cells in bone marrow responded to post-injury cellular cues by converting into regenerative cells, much like skeletal stem cells. Normally, the main job of these Cxcl12-expressing cells, widely known as CAR

cells, is to secrete cytokines, which help regulate neighboring [blood cells](#). They were recruited for healing only after an injury.

"The surprise in our study is that these cells essentially did nothing in terms of making bones, when bones grow longer," Ono said. "It's only when bones are injured that these cells start rushing to repair the defect."

This is important because the remarkable regenerative potential of bones is generally attributed to rare skeletal stem cells, Ono says. These new findings raise the possibility that these mighty [skeletal stem cells](#) could be generated through the transformation of the more available mature stromal [cells](#).

These mature [stromal cells](#) are malleable and readily available throughout life, and could potentially provide an excellent cellular source for bone and tissue regeneration, Ono says.

The study appears in the journal *Nature Communications*.

**More information:** Yuki Matsushita et al. A Wnt-mediated transformation of the bone marrow stromal cell identity orchestrates skeletal regeneration, *Nature Communications* (2020). DOI: [10.1038/s41467-019-14029-w](https://doi.org/10.1038/s41467-019-14029-w)

Provided by University of Michigan

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