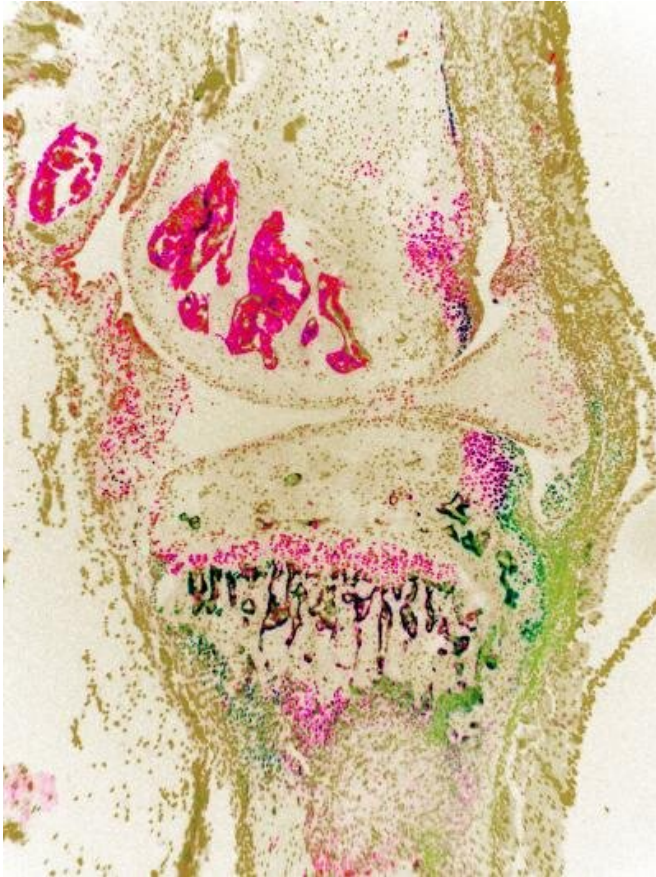


# When it comes to arthritic bone spurs, stem cells hurt instead of heal

12 October 2020, by Cristy Lytal



Following ligament injury, a bone spur forms at the edge of the damaged mouse knee joint (middle right). This pathological bone spur (pink) is made by the same type of stem cells (green) that normally participate in the repair of broken bones. Credit: Stephanie Kuwahara/USC Stem Cell

The same stem cells that heal broken bones can also generate arthritic bone spurs called osteophytes, according to a new study in the *Annals of the Rheumatic Diseases*.

"Although these stem and [progenitor cells](#) promote healthy bone repair in other contexts, they are inappropriately activated to cause a pathological

bony protuberance in the context of arthritis," said Gage Crump, a professor of stem cell biology and regenerative medicine at USC. Crump is the paper's co-corresponding author, along with Cosimo de Bari from the University of Aberdeen in the UK.

Led by Crump and de Bari, an international team of scientists made this discovery by studying mice that had sustained a type of knee injury that causes arthritis. In these mice, a different colored [fluorescent protein](#) labeled each of eight distinct cell populations. This allowed the scientists to view the fluorescent labels under a microscope and trace how the various cell populations contribute to the formation of arthritic bone spurs.

The major culprit turned out to be a type of stem cell with activity in a gene called Sox9, which is also involved in bone repair. At the edge of the arthritic joint, these [cells](#) contributed to cartilage outgrowths that later turned into pathological bone spurs. These cartilage outgrowths had many of the distinctive hallmarks of the cartilage seen during bone regeneration, suggesting further parallels between pathological bone spur formation and normal bone repair.

"By resolving the cellular origins of osteophytes, our work provides clues for how to target these painful [bone](#) spurs that develop at the edge of joints in many arthritis patients," Crump said.

**More information:** Anke J Roelofs et al, Identification of the skeletal progenitor cells forming osteophytes in osteoarthritis, *Annals of the Rheumatic Diseases* (2020). [DOI: 10.1136/annrheumdis-2020-218350](#)

Provided by Keck School of Medicine of USC

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