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## Regenerating joint tissues in patients with Osteoarthritis

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Osteoarthritis (OA) is a degrading joint disease among ageing populations with no definitive treatment. It is estimated that a quarter of Canada's population will be above 65 years old by 2030 with high OA prevalence. Here we propose an OA treatment by implanting a 3D-printed bioactive hydrogel into the defective OA site that can regenerate new joint tissues. This construct mimics the desirable environment for stem cells to attach, grow, and differentiate into the surrounding tissues. The bioactive material is isolated from the patient's own body; however, we use mice cells to produce an excessive amount of extracellular matrix (ECM) which is a network of biological materials around cells. When bone and cartilage ECM is loaded into a hydrogel, it can differentiate stem cells into bone and cartilage cells. This innovative drug-free, patient-specific treatment approach can revolutionize current practices of managing OA.