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**Press information****Wound Dressings to Regenerate Joints**

**Researchers from Inserm and Université de Strasbourg at Unit 1260 "Regenerative Nanomedicine" have developed an implant which, when applied like a wound dressing, regenerates cartilage in the event of major joint lesions and incipient osteoarthritis. The details of this innovation, which has been validated in the preclinical setting, have been published today in [Nature communication](#).**

Increases in life expectancy and the number of accidental traumas call for the development of new types of surgery to replace defective joints. Among the chronic diseases, osteoarthritis – described as destruction of the cartilage affecting the various joint structures, including the bone and synovial tissue that lines the inside of the joints – represents a genuine public health issue. Depending on the clinical diagnosis, various therapeutic options are possible – ranging from microtransplant to joint replacement. Nevertheless, these procedures are all invasive, potentially painful, limited in efficacy and not without side effects. In reality, apart from joint replacement, current treatment strategies are limited to temporary cartilage repair and pain relief. Treatments mainly involve the injection of anti-inflammatories as well as hyaluronic acid to improve joint viscosity. Stem cells can also be used, particularly because they secrete molecules able to control the inflammation.

Within this area and with the aim of regenerating this supple and often elastic connective tissue that covers our joints and enables the bones to move and slide in relation to each other, a team of researchers from Inserm and Université de Strasbourg has recently developed a dressing for cartilage – inspired by the new-generation wound dressings that act as a second skin. With the dressings developed by Ms. Benkirane-Jessel and her team, the therapeutic response reaches a new milestone. We are no longer talking about repair but the actual regeneration of the joint tissue.

What Ms. Benkirane-Jessel's team has developed is an innovative osteoarticular implant technique, able to reconstitute a damaged joint and whose application can be likened to that of wound dressings. "*The implant we've developed is intended for two cases in particular: major cartilage lesions and incipient osteoarthritis.*" she explains.

These dressings comprise two layers. The first – which acts as a support (reminiscent of everyday wound dressings) – is a membrane comprised of polymer nanofibers and supplied with small vesicles containing growth factors in quantities similar to those secreted by our own cells. The second is a layer of hydrogel loaded with hyaluronic acid and stem cells from the patient's own bone marrow. It is these cells that – by differentiating into chondrocytes (cells that form the cartilage) – will regenerate the joint cartilage.

The scientists envision a promising future for their "cartilage dressing" which, in addition to the shoulder and knee joints, could also be used for the temporomandibular joint that connects the jawbone to the skull. Quite incapacitating, disorders in this area can cause

pain, joint sounds and above all the inability to open and close the jaw completely. The research team has already conducted studies on cartilage lesions in small and large animals (mice, rats, sheep and goats), which are highly suitable models with cartilage comparable with that of humans. The objective is to launch a study in humans with a small cohort of 15 patients.

*This project has received the support of Satt Conectus, ANR and the Grand Est region.*

## Sources

### **Preclinical safety study of a combined therapeutic bone wound dressing for osteoarticular regeneration**

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