Joints

Editorial

One upon a time, the orthopedic surgeon in the operating theater, albeit able to rely on her/his hands, her/his colleagues, and her/his nurses and instrumentalists, as well as on several specific tools that she/he and her/his colleagues had developed over the years, cut a somewhat solitary figure. Today, it is a different story: the orthopedic surgeon is no longer alone. She/he can, of course, still rely on her or his hands, her/his colleagues, her/his nurses and instrumentalists, and her/his several tools, but now she/he is also able to draw on the help and expertise of several other collaborators of various other specializations or sometimes coming from entirely different fields. Today's orthopedic surgeon knows that for several procedures, both in the operating theater and in her/his clinical practice, she/he can enlist the help of biologists, biotechnologists, chemists, physicists, molecular biologists, bioengineers, materials engineers and others besides. In recent decades, orthopedics and traumatology, as well as many other surgical and medical fields, have taken advantage of advances of basic sciences, particularly in the management of structural tissue disorders.

To overcome, for example, the lack of donor tissues, both autologous and allogeneic, tissue engineering strategies have been developed with the main purpose of obtaining a mature tissue of higher quality allowing recovery of function in the absence of pain and donor site morbidity. In the field of articular cartilage repair, which is the main topic of this issue of Joints, first-generation "autologous chondrocyte implantation (ACI)" was a result of the combined efforts of different experts, which merged in the development of a successful and innovative multidisciplinary approach (1).

The main drawbacks of ACI techniques were the need for two different surgical operations (which therefore meant greater patient discomfort and costs), the difficulty of execution in cases presenting injuries with difficult access, and the risk of early mobilization of the injected cells. To overcome this last drawback, a multidisciplinary team of biologists, engineers, molecular biologists and surgeons have developed "matrix-induced autologous chondrocyte implantation (MACI)", a technique in which chondrocytes are seeded onto proper scaffolds, mainly membranes (2). Nowadays new biomaterials are available for this purpose: usually resorbable, they may be derived from collagen or hyaluronic acid or they may consist of mixed compounds. In this issue, Francesca Gervaso (a member of Alessandro Sannino's group), in a detailed article illustrating the basis for the development of biocompatible materials, presents the materials scientist's point of view.

Moreover, in order to allow intervention in a single surgical step, and to make it possible to handle lesions also involving the subchondral bone, other cell-free materials have been introduced, like monophasic hyaluronic acid-based or collagen-based membranes or biphasic scaffolds, made from collagen and hydroxyapatite or poly (lactic-co-glycolic) acid and calcium phosphate. Once employed for the knee joint only, these procedures are now used for the treatment of chondral or osteochondral lesions in different joints of the human body. An article on this topic by Roberto Buda and Francesca Vannini with their co-workers from Sandro Giannini's team describes the treatment of talar lesions with a tissue engineering approach, a fine surgical technique that exploits the combined work of materials engineers, biologists and hematologists, who provided a tool for obtaining a curative bone marrow-derived cell concentrate as part of the treatment composite.

Again, an important contribution by hematologists has recently led to the introduction, into clinical practice, of a new series of blood-derived products. In another article in this issue, Giuseppe Filardo and Elizaveta Kon together with co-workers from Maurilio Marcacci's group analyze the contribution of the platelet-derived growth factors contained in one of these products, platelet-rich plasma, as a potential tool for treating or alleviating the symptoms of knee osteoarthritis.

Thus, the orthopedic surgeon is no longer a lone figure; however, in order to obtain more standardized and safer procedures in the future, there is still a need, in several diseases, for significant input from different basic sciences. The valuable contributions of the authors of the current issue can help us to envisage the future direction of our discipline.

REFERENCES

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