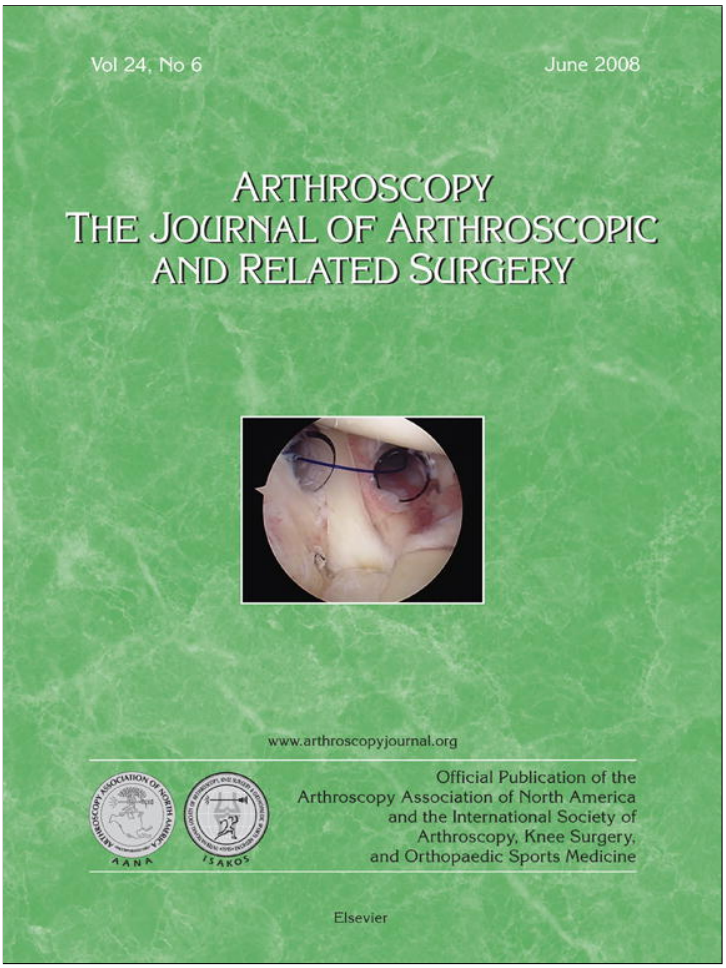

Editorial

Tissue Engineering: A Call for Manuscripts

While not premeditated at the New Year,[1] our challenge as we approach the mid-point of 2008 includes exploration of areas about which we know not much. And on more than one occasion,[2,3] we have recognized that we "don't know much . . . biology." We are, however, motivated to learn. We thus call for manuscripts on the topic of tissue engineering.

We have recently challenged our readers with the intentionally provocative question: "Do basic science articles have clinical relevance?"[4] With regard to tissue engineering, the answer, in our opinion, is yes. We believe that our clinical practices would be radically changed if we could offer our patients tissue engineered solutions for ligament insufficiency,[5,6] cartilage lesions,[7-9] meniscal deficits,[10] or rotator cuff tears.[11-13] As always, we invite readers to send letters to the editor and let us know whether you agree or disagree.[4]

Although we sometimes feel that we "don't know much," we have done our homework.[2,3,5-14] So as we turn our attention to tissue engineering, let us start with what we know. Tissue engineering involves three aspects: matrix + cells + growth factors.[15] In addition, we have learned recently that there is, in fact, a fourth factor: a "bioreactor."[16]

Next, what we may review: While future research may reveal alternatives, collagen matrices are effective tissue engineering scaffolds and are able to be sculpted with regard to both macroscopic morphology (e.g., shaped like a meniscus) or in terms of overall architecture (i.e., replication of an osteochondral bilayer).[7,10-13,16] Autologous cells are bountiful, and autologous stem cells may be readily available, nonimmunogenic, and pluripotential.[5,6,9,16] Growth factors may be bioengineered or derived from autologous platelets.[5,6,9,15,16] Much research is required in this area because growth factors may have paradoxical effects.[14,16]

Finally, what we must learn:

1. Matrix (or scaffold): Is collagen the solution? What are the alternatives? What are the structural design (morphologic) challenges faced by tissue engineers including issues of surface attachment, surface modification, or interface interactions?
2. Cells: Are adult (or postnatal) stem cells truly pluripotential? What are the premier sources of autologous cells, and how can we avoid morbidity of a donor defect? Do allogenic (or xenogenic) cells offer benefits as an alternative, and how can we avoid immunorejection? Do allogenic cells confer risks? Is the greater differentiation potency of embryonic stem cells advantageous? What about the ethical issues? Finally, can we modify or enhance stem cells, or cells of any kind, using gene therapy?
3. Growth factors: Can we induce cells to differentiate using growth factors? See above regarding "areas about which we know not much."
4. Bioreactor: Is there an accepted and fixed definition of a bioreactor, or does the definition continue to evolve? What environment or conditions, in addition to growth factors, influence or speed the creation of functional tissue: pH? temperature? nutrients? oxygen? mechanical inducement or stimulation? others?

We live and work in the present. We strive to have a working knowledge of the past, including, with regard to tissue engineering, the most recent past. Yet a hallmark of AANA, ISAKOS, and *Arthroscopy* is a committed eye to the future . . . (and a hallmark of this Editorial is our positing simple questions with complex answers).

We thus call for manuscripts, both systematic reviews and original scientific articles (for blinded peer-

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review), on the topic of tissue engineering. Our questions are stated above: help us with the answers.

JAMES H. LUBOWITZ, M.D.
Assistant Editor-in-Chief

GARY G. POEHLING, M.D.
Editor-in-Chief

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