

## IX. Conclusion

This bibliometric study of core papers fundamental to tissue engineering provided an overview of the growth of the field, an analysis of NSF's role in the field, a mapping of co-authorship patterns, and an analysis of international patenting. All three analyses of the growth of the field (papers, papers using the term "tissue engineering" and patents) suggest that interest in the area began to emerge in the mid-1980s. The three analyses also agree that growth accelerated dramatically in recent years. Patent analysis of trends in international patenting found in addition that most patents are invented in the US and assigned to US companies. Leading institutions include: MIT, Advanced Tissue Sciences, and Regen Biologics Inc.

We find that NSF supported about 12% of the papers in the field overall. However, NSF focused its support on basic research and biomaterials and on the leading institutions and authors in the field, where it played a larger role.

The patterns of co-authorship in the field were portrayed in an innovative series of figures, tables and maps developed for this study. These reveal the highly collaborative nature of the work undertaken by R Langer and JP Vacanti, with whom most lead authors in the area have worked at least once. Six multi-dimensional maps of the paper-by-paper development of lead authors' work in the area reveal the interweaving of public and private knowledge and the public and private sectors in the development of tissue engineering research, and precisely position NSF support in relation to this.