NEW GENERATION OF BIOMATERIALS FOR IMPLANT APPLICATIONS

Professor Rena Bizios

Department of Biomedical Engineering
The University of Texas at San Antonio
San Antonio, TX

In the past, utilization of synthetic materials to augment, restore and replace biological tissues and organs in the bodies of humans and animals has been, at best, partially successful. Recent advances in research improved understanding of the composition, structure and functions of the biological milieu and also provided evidence of the inherent beauty characteristic of living tissues and organs as well as of the complexity and challenges associated with these systems. This information provided consequent insight and elucidated several reasons behind past failures as well as renewed appreciation of the daunting hurdles that attempts in using inanimate, synthetic materials must overcome in order to be successful when such devices are implanted in the body.

The need to improve the efficacy of implants is motivating design and formulations of new generations of biomaterials for such biomedical applications. In this respect, inspiration is provided by studying the cellular-, molecular- and genetic-level events at the interface between biological tissues and synthetic materials, understanding the underlying mechanisms, and by successfully translating this knowledge to designing, formulating and fabricating the biomaterials of the future. Such novel and creative endeavors, which are currently revolutionizing the biomaterials world, could have significant clinical impact.