**STRATEGIES FOR IMPLANTABLE MATERIALS AND DEVICES.**

**LESSONS LEARNED FROM PHYSIOLOGY AND BIOLOGY**

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**The ultimate objective for all implantable devices (composed of materials) is eventually to place them permanently inside the body of patients (either humans or animals). Materials, the fundamental contributions of biomaterial biomedical engineers and scientists in these endeavors, are key aspects for either successful or potentially problematic outcomes after implantation.**

**Those outcomes are inseparable from the following facts: (1) implantation of materials and medical devices into mammalian bodies requires unavoidable surgical procedures; and (2) those surgical procedures are necessary but inevitably cause cell, tissue, and organ injury/trauma. Success of implantable materials and medical devices requires (and is judged by) desirable, timely, and uncomplicated healing of the unavoidably inflicted injury during the necessary surgical implantation procedure as well as by formation of new, functional tissue in conjunction with the prostheses.**

**Strategies to optimize desirable outcomes have sought, and derived information and inspiration from several sources including fundamental aspects as well as knowledge of the latest advances in physiology, cell-, molecular-, gene-level biology, biochemistry, medicine, pathology, *etc*. For the purposes of tissue regeneration and of new, functional tissue formation (which are mandatory for the success of implants), most valuable inspiration and pertinent information comes from the process of normal tissue wound healing and from several aspects of cellular-, molecular-level biology and biochemistry.**

**Insightful strategies based on select lessons from physiology and biology are unquestionably astute choices and aspects that must be tapped by biomedical engineers and scientists. Such knowledge must be transferred in designing, formulating, and producing the novel, and successful, implantable materials and medical devices of the future.**