Facial, Hearing, and Visual Injuries

Biomimetic Delivery of Biomolecules for Craniofacial Bone Regeneration

Recent improvements in body armor have reduced the rate of combat death but increased the rate of extremity and head and neck injury, burn, and limb loss in surviving casualties. Vascularized composite allotransplantation has recently emerged as a promising strategy for the repair or replacement of lost limbs and complex tissue loss. As vascularized composite allotransplantation is a burgeoning field, there are many fundamental elements relating to its biology and outcome that remain undefined, but have been well defined in standard transplantation. The principal objective of this project, managed by JPC-8 (CRM), is to hone vascularized composite allotransplantation into a useful therapeutic option for patients in need of advanced tissue reconstruction and replacement. The proposed studies include novel fundamental, translation, and clinical investigations specifically designed to inform data-driven clinical practice guidelines for this emerging option for reconstructive surgery. The results of this study will greatly aid decision making regarding ongoing and future cost-effective care of DoD casualties and Veterans with head and neck injuries and limb injury and loss, potentially leading to improved rehabilitation, psychological adjustment, deployability, and reintegration to the community. The ultimate goal is to expand the available options for individuals with combat-related injuries in need of complex tissue reconstruction by elevating vascularized composite allotransplantation to the level of an established therapy for use in appropriately selected personnel with severe traumatic tissue loss.