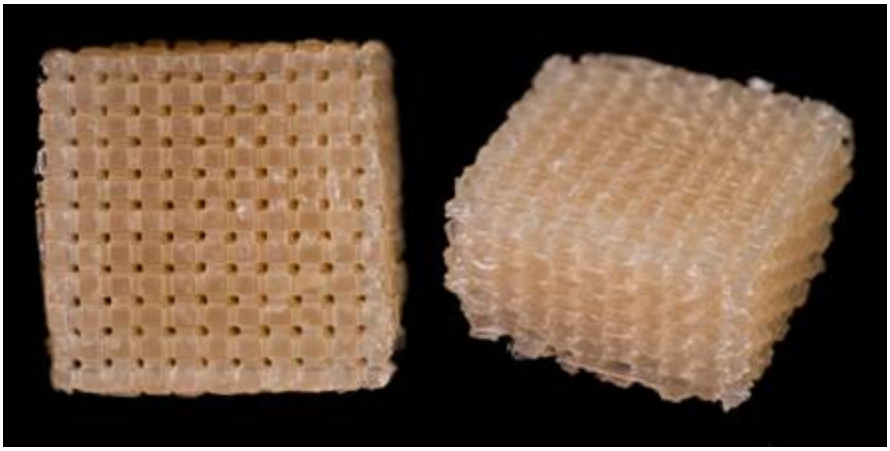
BOTM: September 2008

Poly(lactide-co-glycolide) copolymer (PLGA)

Poly(lactide-co-glycolide) copolymer (PLGA) is the most widely used resorbable polymer in the biomedical field. PLGA is used in a wide range of medical applications including resorbable suture, resorbable wound dressing, facial augmentation, and orthopaedic fixation devices. PLGA is also evaluated as scaffold in tissue regeneration because its degradation product is resorbed through metabolic pathways. Furthermore, the flexibility in its molecular design allows the synthesis of a wide range of polymers with varying mechanical, biologic and degradation properties to suit various applications. However, PLGA can not be crosslinked *in situ*, requiring an invasive surgical procedure for implantation. Furthermore, high temperature or dissolution in organic solvents is required to soften PLGA for injection/processing which is not compatible with cells and proteins.

In situ crosslinkable biomaterials with degradation profiles that can be tailored to a particular application are indispensible for treating irregularly shaped defects and for fabrication of shape-selective scaffolds by rapid prototyping. The degradation characteristics of PLGA can be altered to fit a particular application but they can not be crosslinked *in situ*. A Crosslinkable Star Lactide-co-Glycolide (CSLG) macromer is synthesized that can be used for fabrication of scaffolds in tissue regeneration and other medical applications. The advantages of CSLG macromer include:

1. CSLG macromer can be crosslinked in situ by chemical or photopolymerization to form biodegradable lactide-co-glycolide scaffolds compatible with minimally invasive surgical procedures, with rapid prototyping technologies, and lithographic techniques.
2. The degradation characteristics of products fabricated from CSLG macromer can be tailored to a particular application by changing the ratio of lactide to glycolide and by the extent of crosslinking.
3. Cell-responsive peptides can be conjugated to CSLG macromer to produce 3D biologically functional products for medical applications.



The left and right images show top and side views of the biodegradable scaffold produced from CSLG macromer by rapid prototyping. For more information, please contact Esmaiel Jabbari (Principal Investigator).

This month's biomaterial was provided by the Drug Delivery Special Interest Group.