

Novel Biodegradable Polymer and Hydroxyapatite Structures with Controlled Interfaces

Kacey G. Marra, University of Pittsburgh, DMR-0073586

Overview:

The major focus of this research was to synthesize and characterize novel polymer/ceramic composites, and obtain a fundamental understanding of the effects of varying the interface on mechanical properties. We determined mechanical properties and degradation properties; we also characterized the polymer/ceramic interface. The materials were then examined for bone tissue engineering applications with promising results. These new materials have potential applications as degradable, osteoconductive scaffolds.

Education:

The program supported three graduate students (Sarah Petricca, Keri Boduch-Lee, and Daiwon Kim), and there were ten undergraduate students contributing to this effort. The project was of an interdisciplinary nature, which was highly beneficial for the students involved. Nine manuscripts were submitted (peer-reviewed journal articles: 3 published, 3 in press; 3 published conference proceedings). There have been 27 oral and/or poster presentations as a result of this project, including two student poster awards.

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Outreach:

In 2003, the PI initiated a program geared toward high school female students. The PI has invited sophomore or junior students from public schools into her lab one day a month. This program's goal is to expose the female students to the science environment, thus integrating research with outreach activities. The PI proposes to develop a website describing this new outreach program, permitting students to apply online, and broadening the scientific literacy of those outside the university. Also in 2003, the PI formed and is chairing the "Pittsburgh Biomaterials Group." In 2002, Dr. Marra attended a leadership workshop at the American Chemical Society Meeting in Boston as a recipient of a Leadership Development

Award. The PI has applied those skills to forming and chairing a Women Chemists Committee (WCC) in Pittsburgh in 2002. The WCC is now nominated for an American Chemical Society ChemLuminary Award. Also in 2002, the PI participated in NSF's REUTI program. The PI sponsored a city public high school teacher in her laboratory for five weeks. The teacher conducted experiments, and then worked with the PI to design similar, innovative experiments for high school students. This was a unique opportunity to integrate research and education. In 2001, among other activities, the PI participated in an outreach program for inner-city junior high school female students.