NSF Award in Engineering

Principal investigator: William Miller, chemical and biological engineering
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- **Project:** Toward Large-Scale Platelet Production from Adult Hematopoietic Stem and Progenitor Cells
- **Start Date:** June 15, 2009
- **Total Award Amount:** $599,987

**How the results of this project will benefit society:**
Platelet transfusions are routinely used for a wide range of thrombotic deficiencies, and several million units are transfused each year in the United States and Europe. Successful completion of the proposed research would help enable larger scale production of culture-derived human blood platelets, which are used in blood transfusions and thrombotic deficiencies.

**The problem the project is trying to solve:**
Collecting enough platelets for a single transfusion requires either expensive apheresis equipment or the pooling of platelets from 4 to 8 different donors. There are also concerns with bacterial contamination, blood-borne pathogens, and alloimmunization of recipients. Production of autologous or fully matched platelets from megakaryocytes in culture has the potential to alleviate all of these problems, but many challenges remain to be addressed.

**How the project will work:**
Graduate students and undergraduates working on this project will be trained in an interdisciplinary environment that includes having life science faculty members on graduate student thesis committees and collaboration with faculty and graduate students in the medical school. Graduate students will actively participate, together with students from other engineering and life science departments, and present their work in the seminars and journal club of Northwestern University’s predoctoral Biotechnology Training Program, which also provides interactions with scientists and engineers from industry.

Each graduate student will attend at least one scientific meeting per year and will present his/her results and interact with other attendees at engineering, hematology, and interdisciplinary meetings.

The co-principal investigators will make a concerted effort to recruit underrepresented minority and women graduate students for the Department of Chemical and Biological Engineering and this project, and have supervised currently and in the past a large number of female and minority students. Their former doctoral students are employed by a wide range of pharmaceutical, biotechnology, and engineering companies.

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