

## **UW-Madison Blood Research Program Hematology Research Training Opportunities**

The diverse blood cell types mediate processes required for normal development and physiology, and defects in these cells cause a broad spectrum of human diseases. Hematology is the discipline that focuses on understanding how the blood system is established and maintained to ensure physiological homeostasis, how disruption of the underlying mechanisms cause blood diseases, and developing new strategies to diagnose and treat blood diseases. Non-malignant (benign) or malignant (cancer) blood diseases afflict millions of people worldwide. Benign disorders include anemias (sickle cell anemia, thalassemia, anemia associated with aging and chronic infection), blood clotting disorders (hemophilia), and platelet abnormalities. These diseases typically involve serious complications for the patient and can reduce longevity. Most of the malignant hematology disorders, notably leukemia, lymphoma, multiple myeloma, and myelodysplastic syndrome, remain exceedingly challenging to treat. There is an urgent need to discover new diagnostic and therapeutic approaches for blood diseases in children and adults.

A particularly compelling feature of research in hematology is its ability to advance fundamental knowledge in a way that profoundly impacts upon diverse scientific disciplines, as well as to improve clinical medicine. As many problems within the realm of hematology remain unsolved, hematology research continues to be a high priority for multiple institutes of the National Institutes of Health, as well as private foundations, including American Cancer Society and Leukemia and Lymphoma Society. Undoubtedly, future research advances in hematology have potential to greatly benefit a large cohort of patients with blood disorders and therefore to transform an important sector in public health. Accordingly, the UW-Madison Blood Research Program has prioritized the development and implementation of opportunities to introduce students to hematology research and productive career paths in this area. These opportunities include: (1) discussions with UW-Madison faculty to gain a rudimentary foundation in hematology research; and (2) direct exposure to hematology research through shadowing and hands-on laboratory training.

### **Discussion Topics**

1. Solving Fundamental and Medical Problems Through Laboratory Investigation
2. Hematology as a Vital Discipline of Biomedical Science  
(fundamental discoveries and benign blood disorders)
3. Hematology as a Vital Discipline of Biomedical Science  
(blood cancers)
4. Hematology: a Clinical Medicine Perspective

## 5. Career Avenues and Research Training Mechanisms

### **Opportunities for High School Students and Undergraduates to Engage in Hematology Research**

1. Shadowing -Through direct interaction with a hematology researcher, the trainee will observe the process of addressing scientific questions through laboratory investigation.
2. Short-term (1 month - 6 months) - The trainee will work with a hematology researcher at least once per week to begin to gain hands-on experience in laboratory investigation.
3. Long-term (greater than 6 months) - The trainee will work with a hematology researcher at least twice per week to begin to develop advanced skills in laboratory investigation.

When trainees are considering to transition from a short-term to a long-term research experience, their researcher mentors will sponsor applications to prestigious scholarships or financial support, including but not limited to:

1. NIH Training Programs in the Biomedical Sciences
2. ASH Trainee Research Award
3. Supplemental funding linked to an existing NIH R01 grant

### **Opportunities for Advanced Training in Hematology Research**

1. Graduate school (various PhD programs)
2. MD/PhD