Lab Spotlight: Kousteni Lab

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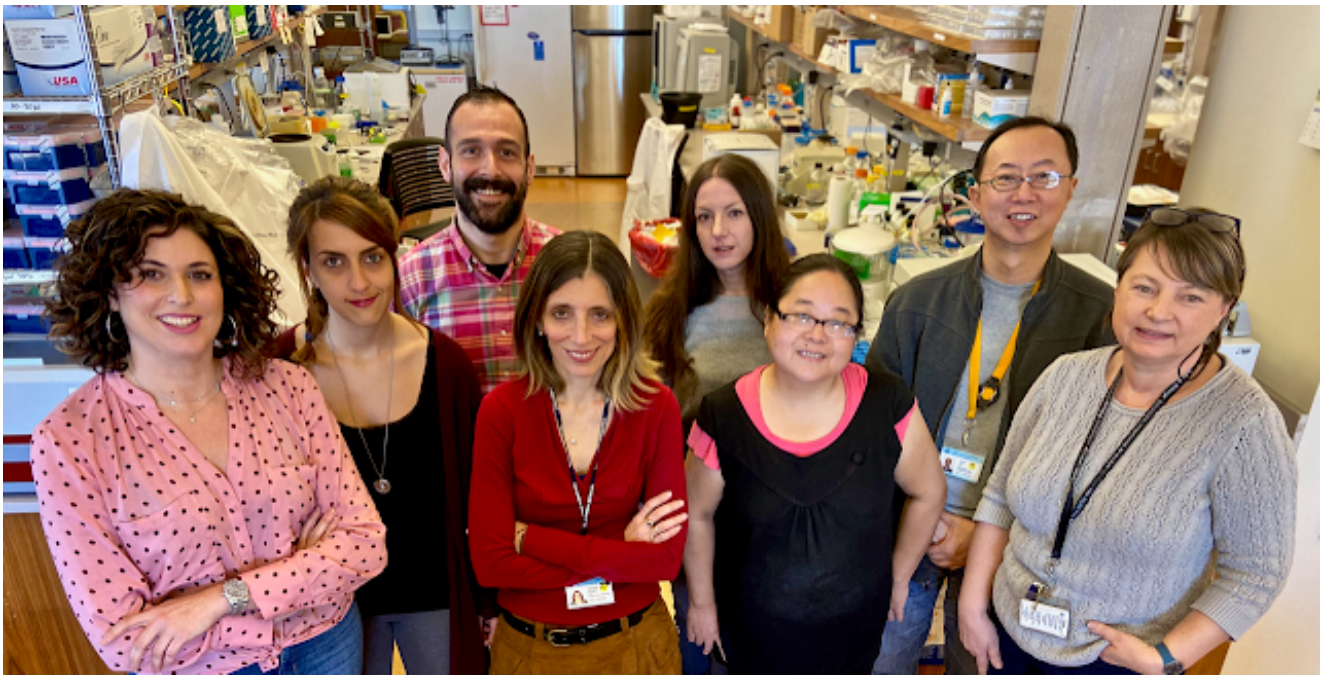
Deconstructing Blood Cell Research
Building the Hematology Community

Each month, Simply Blood spotlights a lab focused on the research of basic hematology, immunology, stem cell research, cell and gene therapy, and other related aspects. Get to know these different labs around the world! This month, we are featuring the Kousteni Lab at Columbia University in New York, USA.



1. How long have you had your lab?
I started my lab when I moved to Columbia University in July of 2006.

2. How many members make up your lab? Students/postdocs?
Currently the lab consists of 1 technician/lab-manager, 2 postdocs, 4 associate research scientists and one assistant professor. The summer is our busiest time of the year since we host undergraduate trainees from the SPURS program of the Department of Physiology and

Cellular Biophysics for underrepresented students, a teacher trainee from Columbia's Summer Research Program for Science Teachers, undergraduates from NYIT and visiting scientists or postdocs from various Universities.

3. What is the major research theme of your lab?
We study the multiple functions of mesenchymal stem cells (MSC) of the bone marrow in hematopoietic stem cell (HSC) fate, with an emphasis on the development of myeloid hematological malignancies: Myelodysplasia (MDS) and Acute Myeloid Leukemia (AML). Specifically, we are exploring how extrinsic factors triggered from the bone marrow stroma microenvironment can affect growth of disease-initiating stem cells in MDS or AML as well as the transformation of MDS to AML.

4. What is the most exciting project in your lab right now?
One of the projects close to completion is focused on characterizing a signaling pathway that mediates the crosstalk between osteoblasts and leukemia cells, affecting AML engraftment and progression. In fact, Dr. Galan-Diez, leading the project, is pursuing her next step as an independent researcher. Dr. Cuesta-Dominguez, identifies hematopoietic stem cell intrinsic and extrinsic mechanisms, the latter induced by MSC that promote transformation of MDS to AML; he also traces the identity of stromal cells and how their functions change during MDS development and transformation to AML. Dr. Vgenopoulou uses an AML model to study how leukemia stem cells remodel MSC to promote their engraftment and proliferation. Dr. Mosialou is examining how bone marrow stromal cells can be targeted for therapeutic purposes.

5. What's your best approach to mentoring students in the lab?
Our lab works on understanding the mechanisms of development and progression of two devastating diseases: MDS and AML. The first thing I try to instill to my trainees is care and respect for the patients and their families. If they want to make a difference in the life of patients, they should not be afraid to delve into challenging projects. I try to inspire them with such projects and to cultivate passion for their research. I teach them to have an open mind for new hypotheses -even far-reaching ones- and conclusions. To not be afraid to look at their data from different angles. And to be happy when their hypotheses do not work, because chances are their experiments will lead them to something more novel than the "lost" hypothesis. I encourage them to read the literature and to discuss as frequently as possible their ideas and results with me and the rest of the group or other relevant groups at Columbia University.

6. What's the biggest accomplishment your lab has had recently?
Our lab entered the bone marrow niche field after the discovery of a function of the skeleton as an inducer of leukemogenesis. We identified a single activating mutation in the osteoblast that disrupts hematopoiesis leading to leukemogenic transformation of HSCs and

establishment of MDS progressing to AML. More importantly, the same mutation and signaling pathway were identified in more than a third of patients with MDS and AML. We have also found that manipulating the osteoblasts pool affects leukemia progression.

7. What is the key to running a successful lab?
There are probably as many ways as different PIs and teams! I think the key is the people. For our lab I try to give to trainees stimulating projects and also to involve them in each other's work. Having a good spirit of collaboration, discussion and teamwork.

8. What facilities or equipment does your lab absolutely depend on?
Several! We definitively rely on the Animal Facilities here at Columbia, the Columbia Stem Cell Initiative (CSCI) Flow Cytometry, HICCC (Cancer Center) Oncology Precision Therapeutics and Imaging Core (OPTIC), the Columbia Genome Center for our RNAseq and the Single Cell Analysis Core but also the Genetically Modified Mouse Models Shared Resource, the histology core…

9. What has been your greatest challenge in managing your lab?
This is a challenge and a joy: seeing knowledgeable and successful members of the lab completing their projects and moving on to the next step in their professional life. They are hard to replace and they are missed.

10. What advice do you have for new investigators just opening their lab?
To pursue their research with passion and commitment. There are no easy or safe roads to take in science -like in life- so it is always better that they love what they do when difficulties arise. To find good mentors, their influence in their professional and personal life will be paramount.

11. What was the most exciting part about starting your new lab?
Being able to choose entirely every project that was meaningful and exciting and had my chance to create a small but hopefully impactful niche.

12. Does your lab attend the ISEH annual meeting?
Yes! Absolutely, we try to present at every ISEH meeting. ISEH meetings always bring outstanding Science on basic, translational and clinical hematology in a very "familiar" and unique way. It is a great place for networking both for consolidated scientist as well as junior PIs.

13. What is the most beneficial aspect of ISEH membership for your lab?
Apart from attending the annual meeting, access to Experimental Hematology as well as Simply Blood, is a good way to know everyone in the field and keep track of cutting-edge research.

14. How do members of your lab celebrate accomplishments?
We are a very international lab: we have Polish, Chinese, Greek, Korean, Italian and Spaniard members, a reflection of New York´s multicultural and “Babel Tower” atmosphere. We celebrate with food and drinks from all these different places. We also like NY restaurant week.

15. Does your lab have any fun traditions?
We celebrate not only accomplishments but also birthdays, new babies or multicultural traditions along the year. Last year we spent a weekend at the beach in Long Island and that was a blast!