JCB meeting: Cell Biology of Disease

Tom Misteli

Editor-in-Chief, The *Journal of Cell Biology*

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The New York City skyline as viewed from the New York Academy of Sciences' conference space where the *JCB* Cell Biology of Disease meeting was held.

The *Journal of Cell Biology* has organized its first ever scientific conference. Why? There are several good reasons. For one, the *JCB* is first and foremost a community journal. It is run by scientists for scientists, and we consider it our mission to bring scientists together, be it by communicating science in our pages, on our web-based forums such as our biobytes and biosights podcasts, our biowrites blog, on our Facebook page, or as of recently on Twitter. Holding a scientific conference follows that spirit of connecting the cell biology community.

A strong motivation for us to hold a meeting is our deep belief that the *JCB* is not merely a middleman in the communication of science, but that a primary goal of the journal, and the community it represents, is to define the future of cell biology. We have done this for many years by leading the way on policy issues such as public access to the scientific literature and data integrity. More importantly, the journal advances the field by identifying, highlighting, and supporting new areas of cell biological research. The first *JCB* meeting, jointly organized with the New York Academy of Sciences and held in New York on September 23–25, 2009, focused on one such rapidly emerging area: the Cell Biology of Disease.

In contrast with decades past, contemporary cell biology is more than just basic science. Cell biology is now an applied and medically relevant discipline—and increasingly so. Some of today's best cell biology is done in models of disease, differentiation, and developmental systems, and many cell biological observations are rapidly translated into biotechnological and medical applications.

Cell biology applied to diseases is highly relevant and impacts the future of biomedical research. We now realize that the simple identification of a disease-causing gene is not sufficient to fully understand disease pathology. Truly understanding a disease is to uncover the cell biological consequences of any disease mutation. After all, all diseases are caused by cell biological defects. A complete characterization of the in vivo cellular behavior of disease cells is also essential for the development of successful therapeutic applications. Without cell biology, there are no effective therapies.

But the cell biological elucidation of disease is a two-way street. Diseases are also a powerful tool for cell biologists to probe their favorite process in vivo. While elucidation of defective pathways leads to a deeper understanding of disease symptoms and eventually to cures, the aberrant nature of a given cellular process in a disease cell represents an in vivo experiment whose results often prove informative about how cellular processes are organized under normal circumstances. There is no better cell biological test tube than a disease cell.

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Now is the time to vigorously embark on a cellular investigation of diseases. Outstanding cell biology work over recent decades has led to the description and thorough, albeit still incomplete, characterization of the molecular basis of most fundamental cellular processes. At the same time, genomic approaches are identifying disease genes at an unprecedented rate. Every time a new disease gene is identified, we can tap into the vast accumulated cell biological knowledge and rapidly interrogate the affected pathways. Cell biology, in that sense, is a direct, and necessary, extension of gene-hunting efforts. The confluence of a broad molecular description of cellular processes and the surge in identification of disease genes begs for a strong commitment by the cell biology community to apply its knowledge to disease.

The *JCB* meeting focused on three large topics particularly relevant to disease: chromosomes, cancer, and stem cells. An array of tantalizing science was presented by world leaders in their field and by a hand-picked group of some of the most outstanding up-and-coming young investigators. The science explored the often unexpected links between these areas ranging from the role of chromatin in stem cells, genome instability in cancer, the importance of migration in metastasis, or the contribution of stem cells to aging and cancer. A detailed description of the scientific content is available on our biowrites blog, Facebook, and Twitter.

The take-home message from the meeting is clear: Cell biologists do not need to choose between investigating fundamental cellular processes and studying disease mechanisms. Both can—and should—be done at the same time by investigating the cell biology of disease. When we do cell biology in disease systems, everyone wins.

Web addresses are as follows:
biobytes, http://jcb.rupress.org/biobytes
biosights, http://jcb.rupress.org/biosights
biowrites, https://rupress.org/JCB/pages/jcb-biowrites
Facebook, http://www.facebook.com/JCellBiol
Twitter, http://twitter.com/jcellbiol

Correspondence to Tom Misteli:
tmisteli@rockefeller .edu