CellPress

Risk and Reward

Last month, *Cell Systems* presented a Young Investigator Award at the International Conference on Systems Biology in Barcelona. We proposed that this year's award recognize a compelling, clearly formulated project that required its authors to take at least one substantial risk. As it happens, two projects stood out, and so two Young Investigator Awards were given.

Laurel Rohde and Ravi Desai, postdoctoral fellows working with Andy Oates at the Francis Crick Institute, received an award for their work on tissue patterning in the developing zebrafish embryo. Do individual cells contain enough internal information to generate the patterns observed within the embryo across space and time? Or does patterning require positional cues provided by the larger tissue, such as morphogen gradients or cell-cell interactions? To address these questions, Rhode and Desai made the risky choice to isolate and culture specific primary zebrafish cells. No protocol for doing this existed before. Now armed with this approach, they are poised to quantitatively study the innate properties of individual precursor cells via real-time imaging and other techniques.

Javier Estrada, a postdoctoral fellow with Angela DePace and Jeremy Gunawardena at Harvard, was our other awardee. He developed theory to explain the sharp gene expression responses observed in eukaryotes. Contrary to conventional thinking, Estrada argued that conventional descriptions for how pairs of transcription factors cooperatively bind DNA, models proposed decades ago to explain observations made in bacteria, cannot explain data observed in eukaryotes. Hence, alternate regulatory mechanisms may be at work, such as higher-order cooperative binding by multiple proteins or the maintenance of regulatory DNA away from thermodynamic equilibrium by epigenetic mechanisms. Challenging "textbook" understanding is certainly risky indeed.

We are thrilled to recognize these young investigators and the chances they took. Their projects highlight a virtuous cycle: new biological insights often require fresh perspectives, and fresh perspectives can be won by taking risks.

In fact, sometimes it is possible to take scientific risks without performing a study at all. For example, Johan Elf (325–327) proposes a hypothesis for how homologous sequences "find" each other inside the cell, a question of central importance for understanding homologous recombination and improving CRISPR-Cas-mediated gene editing. Hint: it may involve a "parallel search" process. We applaud the intellectual risk inherent in sharing untested ideas with the broader research community.

Risk takes many forms. Questioning the foundational ideas of a field, collaborating across disciplines in non-standard ways, developing technology or approaches that are new to biology, or tackling dramatically different problems at different stages of one's career are but a few ways to take scientific risks. Historically, risk taking has facilitated fundamental discoveries, and it can be argued that a more conservative approach to science has unfortunately dominated US biomedical research in recent years. These are weighty issues indeed, beyond of the remit of a single journal. But journals like ours can demonstrate what we find to be valuable by rewarding risk in and beyond our pages.

H. Craig Mak
Editor, *Cell Systems*

Quincey Justman
Scientific Editor, *Cell Systems*
http://dx.doi.org/10.1016/j.cels.2016.10.011