Baserga honored for work on ribosomes and commitment to teaching and mentoring

By Mariana Figuera-Losada

Susan J. Baserga, professor of molecular biophysics and biochemistry, genetics, and therapeutic radiology at Yale University, is the winner of this year’s American Society for Biochemistry and Molecular Biology William C. Rose Award for her valuable contributions to the field of ribosome biogenesis research and her dedication as a teacher and a mentor. The Rose award is given to scientists who have made outstanding contributions to biochemical and molecular biology research and have a proven commitment to the education of younger scientists.

Baserga has a long-standing interest in fundamental aspects of ribosome biogenesis, the nucleolus, human diseases of making ribosomes (ribosomopathies), and on the impact of ribosome biogenesis on cell growth, cell division and cancer. Her work established the SSU processome as the large ribonucleoprotein required for processing and assembly of the small ribosomal subunit, and has continued to study the 17 new proteins that were first described in the Nature 2002 report to define their role in making ribosomes as part of a large RNA-protein complex (http://medicine.yale.edu/lab/baserga/publications/). Mechanistically, Dr. Baserga was the first to show that nucleolar RNA helicase activity was regulated by protein co-factors, and demonstrated Esf2 activation of Dbp8 ATPase activity in vitro. Furthermore, she proposed the Utp24 protein as a pre-rRNA cleavage enzyme for the first time. In collaborative work, she has studied the effect of lack on ribosome biogenesis on the cell cycle and of de-ubiquitination on ribosome biogenesis. Recent work includes a collaborative publication with crystallographer Traci Hall on a novel fold in the RNA binding protein Puf-A/Puf6.

Baserga has published key initial studies on the molecular pathogenesis of North American Childhood Cirrhosis as a potential disease of ribosome biogenesis. Because of the increasing number of ribosomopathies that are being described, almost all of which are congenital diseases, Baserga has recently moved to the study of ribosome biogenesis in embryonic development in fish (with collaborator Pam Yelick) and frogs (with collaborator Mustafa Khokha). To recapitulate the phenotypes of these diseases and to study their molecular basis, the Baserga lab uses yeast and human cell lines as well as animal models and has established a bench-to-bed connection fundamental for the advancement of biomedical research.

In his letter of recommendation, Joseph G. Gall at the Carnegie Institution says, “Susan is not afraid to tackle difficult molecular problems. She has been unusually successful in elucidating the complexities of RNA-based cellular machines and the way they control everything from transcription and transcript processing to translation by the ribosome.” Jonathan Warner at Albert Einstein College of Medicine also supports Baserga’s nomination, saying “She had the insight to select an important problem and to pursue it from a variety of angles, digging deeper and deeper, learning new and important facts leading to new and important concepts.”

At Yale, Baserga is a driving force for education at the undergraduate, graduate and postgraduate levels. She is chair of the Beckman Scholars Program, which funds a research program for Yale undergraduates, and served on the steering committee of the Howard Hughes Medical Institute Undergraduate Science Program; her school’s Teaching Support Committee; and the Undergraduate Advisory Committee of the
Science, Technology and Research Scholars Program. The latter supports underrepresented minorities and economically underprivileged students in science, technology, engineering and medicine.

Baserga also has been the associate director of Yale’s M.D./Ph.D. program and was a member of the National Institute of General Medical Sciences study section for training grant review, influencing national policies, and improving medical scientist training and Ph.D. programs. She is the Program Director for the largest graduate training grant at Yale (in cell and molecular biology), is the Director of Medical Studies and has been the course director for the medical student biochemistry course since 2002. In 2014, Baserga was awarded the Charles W. Bohmfalk Prize for teaching in the basic sciences at the Yale School of Medicine.

Baserga obtained her B.S. and M.Phil. at Yale, a medical degree at the Yale School of Medicine and a Ph.D. from Yale’s Department of Human Genetics. She was an Assistant Professor at the Yale School of Medicine and has been a Professor in the departments of Molecular Biophysics and Biochemistry, Genetics, and Therapeutic Radiology at the same institution since 2007.

Baserga’s ASBMB 2016 annual meeting award lecture, “When good ribosomes go bad,” is scheduled for 2:35 p.m. on Tuesday, April 5, in Room 6B of the San Diego Convention Center.

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Quote from winner: “Utterly surprised, utterly grateful, utterly happy to be doing science!”