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Iván López-Montero

IVÁN LÓPEZ-MONTERO

Current Postion: Postdoctoral Researcher, Department of Physical Chemistry, Complutense University, Madrid, Spain. Advisor: Prof. Francisco Monroy.

Education: Ph.D. in Molecular Biophysics, Université Denis-Diderot, Paris (2006); advisors: Prof. Philippe F. Devaux and Dr. Marisela Vélez. M.Sc. in Molecular Biophysics, Université Pierre et Marie Curie, Paris (2002). M.Sc. in Condensed Matter Physics, Universidad Autónoma de Madrid, Spain (2001).

Nonscientific Interests: Listening to and playing early music, French history and culture.

My Ph.D. thesis focused on lipid asymmetry, the spontaneous flip-flop of ceramides as well as the biological implications of the enzymatic conversion of sphingomyelin into ceramide. My current research focuses on experimental membrane mechanics with my long-term goal being to infer the mechanical role of lipid membranes in different biological processes such as apoptosis and bacterial cell division. Here, I rationalize the ceramide-enriched membranes formed during apoptosis on the basis of the solid-like mechanical behavior found in these systems, in contrast to more conventional lipid systems behaving as fluid membranes. With regard to the mechanics of cell division, I have contributed to the understanding of the mechanical role of lipid domains in bacterial lipid extracts and the mechanical impact of division proteins (FtsZ and ZipA) on the lipid matrix of the bacterial membrane. My ongoing work involves the development of bioinspired artificial systems based on giant vesicles made of native membranes and highly purified components. (Read López-Montero's article; DOI: 10.1021/sb3000063)


Tomoaki Matsuura

TOMOAKI MATSUURA

Current Postion: Associate Professor, Department of Biotechnology, Graduate School of Engineering, Osaka University, Japan.

Education: Ph.D. in Engineering, Osaka University (1999) with Prof. Itaru Urabe. Postdoctoral Fellow, University of Zurich (1999–2003), with Dr. Andreas Pluckthun.

Nonscientific Interests: Music and tennis.

I utilize a cell-free protein synthesis system in most of the research I am involved in. With this system, I analyze the properties (mainly kinetics) of protein translation and directed evolution of proteins and construct artificial cells. In this study, we report the construction of artificial compartments containing components necessary for protein synthesis. As our artificial compartment is composed of only defined components, almost all parameters are variables; we can alter the concentration of any of the constituents and even the compartment size. Therefore, in contrast to simulators that work in a computer, our artificial compartment can be interpreted as a wet simulator, where parameters can be varied as desired to study their effect on system behavior. We also describe the use of this simulator to investigate the effects of compartment volume alone on intracompartmental reactions. (Read Matsuura's article; DOI: 10.1021/sb300041z)


Lara Hernández Moleiro

LARA HERNÁNDEZ MOLEIRO

Current Postion: Ph.D. Candidate, Department of Physical Chemistry, Complutense Universityy, Madrid, Spain. Advisor: Prof. Francisco Monroy.

Education: M.Sc. in Biology and Biochemistry, University of Navarra, Spain (2008)

Nonscientific Interests: Music, traveling, spending time with friends, clubbing, cinema and dancing.

My research is focused on synthetic and physical approaches to protein motors embedded in lipid membranes. I am currently enrolled in a project to determine the functional conditions of insertion of the DNA-portal complex of the bacteriophage φ29 into the membrane of giant vesicles. Here, I have worked on the biochemical and structural adaptation of the lipid membrane to the outer surface of the connector protein. My complementary expertise deals with the mechanical characterization of biological membranes using tools such as flickering spectroscopy and micropipet manipulation in both giant vesicles and living cells. Ongoing research focuses on the mechanical changes occurring in the membrane when the whole portal complex of the φ29/T7 phages is integrated at

Received: August 27, 2012
Published: September 21, 2012

physiological conditions of activity. (Read Moleiro's article; DOI: 10.1021/sb3000063)

Jonghyeon Shin

■ JONGHYEON SHIN

Current Postion: Ph.D. Candidate, Physics Department, University of Minnesota in Twin Cities, Minneapolis, Minnesota. Advisor: Dr. Vincent Noireaux

Education: B.S. in Physics, Sung Kyun Kwan University, Republic of Korea.

Nonscientific Interests: Sports (anything with a ball) and music

My research interests range from the quantitative analysis of gene expression to gene circuits, artificial cells, and self-assembly of phages. In this paper we describe the development of a cell-free gene expression system as an experimental platform. This unique system included sink mechanisms of mRNA and protein, extended the repertoire of transcriptional units, and was able to be used for quantitative analysis of single gene expression in a test tube. On the basis of our system, we constructed and studied simple genetic regulatory circuits containing activation and repression units. These genetic regulatory circuits were able to be encapsulated in phospholipid vesicles, as well. Moreover, as a toy-model of a complex gene network, cell-free synthesis of T7 bacteriophage was performed. All processes including DNA replication, self-assembly, and DNA packaging occurred from T7 DNA with the cell-free system in a single test tube. (Read Shin's articles; DOI: 10.1021/sb200016s, DOI: 10.1021/sb300049p)

Ming Wang

■ MING WANG

Current Postion: Postdoctoral researcher, Department of Biomedical Engineering, Tufts University, Boston, Massachusetts. Advisor: Dr. Qiaobing Xu

Education: Ph.D. in Chemistry, Chinese Academy of Sciences, China (2009). B.S. in Chemistry, Anqing Normal College, China (2003)

Nonscientific Interests: Movies, music, spending time with family

My graduate research focused on the design and synthesis of fluorescent biosensors and supramolecular functional materials, through which simple and convenient enzyme activity assays as well as high-throughput screening of enzyme inhibitors have been achieved. Currently, I am developing a combinatorial library of lipids with facile and mild chemistry and exploring their application in *in vitro* and *in vivo* biomacromolecule delivery. I am interested in investigating the structure–function relationship of lipid-mediated biomacromolecule delivery and how these principles can be utilized to design the next generation of drug nanocarriers. I am also interested in designing stimuli-responsive polymers and inorganic nanoparticles to deliver genes and chemotherapy drugs. (Read Wang's article; DOI: 10.1021/sb300023h)