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EDITORIAL

Meeting report: "Manipulation of cell pathways in drug development" and introduction to this issue

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This special issue represents the perspective of the 3rd International Symposium on Molecular Technology, "Manipulation of Cell Pathways in Drug Development," organized by the authors of these articles. The meeting took place at Shahid Beheshti University May 5-7, 2009 (15-17 Ordibehesht 1388). The meeting took 3 days and was attended by 550 participants including faculty, clinicians, and student researchers. It was sponsored by the International Cell Death Society; Scientists Without Borders; Neuroscience Research Center (SBMU); High Tech Developmental Center, Ministry of Health (HTDC); Research Center for Gastrointestinal and Liver Disease (RCGLD); and the Iranian Cell Death Association (ICDA). Topics included Manipulation of cell pathways in drug development; Cell death and cancer; Therapeutic applications; Pathways of cell death; and Regulation of cell pathways. Presentations were by faculty from eight countries and four continents as well as many fine short presentations and posters.

Several of the presenters contributed articles that reflect both the goals of the meeting—to use knowledge of basic cell and molecular biology to aid in the design of therapeutic drugs—and the related goals of this journal, which include encouragement of interaction between clinician and researcher. These articles exemplify the means of accomplishing these goals. The logo for this journal, "From Bed to Bench to Bed" emphasizes a desire for cooperation between physicians and basic scientists. A clinical problem should suggest a hypothesis of a mechanism that can be tested in the controlled circumstances of a laboratory setting. Laboratory testing confirms the hypothesis and suggests a means of addressing the pathology for either prevention or cure, and in the best of circumstances the cooperation leads to an important benefit for humankind. Alternatively, advances in laboratory techniques or knowledge suggest potential new approaches to therapy.

The speakers and their topics started from clinical problems and then turned to how basic research attempts to address the problems and how our knowledge of basic problems can be used to develop specific drugs. The articles we present here represent either illustrations of the best results of this cooperation or examples of hot and cutting-edge science that have great clinical potential and are awaiting interaction between laboratory scientists and clinicians to develop new treatments. One of the goals of this issue is to encourage that interaction.

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The series of articles opens with a description of one of the most spectacular and successful results of that cooperation, and one which has saved 50,000,000 lives since its inception almost exactly 40 years ago, oral rehydration therapy (ORT) for cholera. The keynote speaker for the meeting, David Sachar, describes how a team of physicians had the good sense to query the mechanism that led to massive retention of water in the lumen of the colon and its subsequent loss, and they contacted some of the leading laboratories studying ion transport. Although the sodium-glucose co-transporter was not completely understood, laboratory technology led to the demonstration that glucose could help carry sodium back from the lumen into the intestinal epithelium, with consequent osmotic return of water to the body. ORT was born.

Other articles suggest frontiers in which this type of cooperation is beginning to produce results or suggests results. Cristina Mussini describes how the advance of therapy for HIV-AIDS depends heavily on a deep understanding of the biology of retroviral attachment and reproduction as well as an understanding of the means by which the immune system responds to viral infection.

We then turn to the question of intelligent drug design. Lockshin introduces this section by comparing the theoretical promise of therapies regulating apoptosis to the somewhat disappointing first results, and suggests that the biology of the responding cells needs to be better understood. This general caution is fo llowed by several examples of potential therapies that show promise for rapid development as the biology is worked out: Plant lipids (Mehrpour) and marine cytotoxins (Folmer *et al*) as sources for drugs with exciting bioactivity. Finally, four authors provide current examples of explorations that are just about to reach the clinical threshold: targeted regulation of bax and bak (Vogel *et al*); an analysis of how the increasingly understood complexity of Apoptosis Inducing Factor offers both a challenge to researchers and the promise of subtle and targeted therapies (Hangen *et al*); the potential of a newly-understood class of regulatory proteins called prohibitins (Fimia); and the development of "designer drugs" in the form of peptidomimetics to activate or inhibit molecules central to apoptosis and autophagy (Cecconi).

The latter series of articles addresses the issue of understanding apoptosis and autophagy as a key to helping the body resist the onslaught of toxic or infectious agents, but they also represent an invitation to future authors to present clinical situations in need of resolution or laboratory findings of potential interest to the clinician. This series illustrates what, in our minds, is the best of this interface. If we can encourage our readers to respond with similar findings and reports, we will have succeeded in our mission.