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EDITORIAL

Helicases and NTP-Driven Nucleic Acid Machines: Structure, Function and Roles in Human Disease

In 2001, Sandy Weller and Steve Matson organised the first FASEB meeting on "Helicases: Structure, Function and Roles in Human Diseases". Thanks to their initiative and high scientific standards the conference became a biennial event. It was organised by Anna Pyle and Smita Patel in 2003 and, in 2005, Steve Kowalczykowski and Patrick Linder brought it to the Swiss Alps for the first time. The success of these meetings has been largely due to the many excellent contributions and the enthusiasm of the participants.

Since the discovery of the structure of DNA we have known that nucleic acids can exist in a complementary, base-paired form, and that these double-stranded molecules must first be unwound in order that replication, repair, transcription, translation or degradation may occur. These many different processes require a variety of different machines that use NTP to perform their work, either to unwind the double-stranded molecule or to translocate along its length. In line with the *in vivo* situation, the 2005 meeting included presentations of many different machines from a variety of organisms, including DNA replication, recombination, transcription and restriction, as well as RNA metabolism. The methods used to study the enzyme components of these machines ranged from genetic analysis to sophisticated biochemical investigation, and from structural examination to analysis of single molecules. The organisms studied ranged from bacteriophages and bacteria to eukaryotes both simple and complex and including humans. Remarkably, these seemingly different enzymes from disparate sources and pathways were very often found to function according to highly similar or unified mechanisms. The meeting generated a combination of convivial individuals who contributed to a highly stimulating exchange of concepts and ideas on mechanism and function, achieving in full the original aspirations of Sandy Weller and Steve Matson. The success of these meetings, and the willingness of their contributors to produce these reviews, reflect important aspects of science: friendship and open discussions are well represented in the "helicase community".

This issue of *NAR* contains a collection of reviews that describe part of this exciting field, its recent progress, and its impact on the understanding of basic cellular processes. All of the articles have been subjected to the full peer review process by editors and external referees that operates for all *NAR* submissions. We hope that the series will foster increased levels of enthusiasm in the field. We would like to thank the editors of *NAR* for their support, the authors for their contributions and patience and the referees for their constructive criticism. Special thanks go to Sandy Weller (1), who was the driving force in establishing these conferences but whose contribution—much to our chagrin—could not be included within this series.

Patrick Linder and Steve Kowalczykowski

Geneva and Davis, June 2006

(1) Chattopadhyay S, Chen Y, Weller SK. (2006). The two helicases of herpes simplex virus type 1 (HSV-1). Front Biosci. 11:2213–23.