

(wileyonlinelibrary.com) DOI 10.1002/psc.1291

# Chemical protein synthesis

The fourth international conference on Probing Protein Function through Chemistry was held at Schloss Ringberg in the Bavarian Alps above Lake Tegernsee. It was sponsored by the Deutsche Forschungsgemeinschaft and the Max Planck Society. Previous conferences have been organized on Heron Island, Australia, in Sant Feliu de Guixols, Spain, and at Schloss Ringberg, Germany. It is the aim of this conference series to discuss new developments in the chemical synthesis and chemical manipulation of proteins, and to explore the potential of tailor-made proteins to probe biochemical and cellular questions. At this interface between biochemistry and cell physiology, chemistry can provide new approaches for studying structure and function of proteins *in vitro* and *in vivo*. Since the development of solid-phase peptide synthesis and importantly the introduction of native chemical ligation and expressed protein ligation in the 1990s, the door has been opened for the design of new biomolecules which can be used for biophysical, biochemical and cellular investigations. It was, therefore, an important goal of the meetings to bring together a multidisciplinary selection of scientists, not only interested in the advancement of the chemistry of proteins but also those pursuing pertinent biological questions. The diverse subjects afforded ample time for debates which was supported by allowing talks to include at least 15 min for discussion. It is also an important aspect of the conference series to invite young scientists early in their career.

The last conference at Schloss Ringberg (20–23 September 2009) had as one focal point chemical approaches to post-translational modification of certain proteins that have recently gained considerable interest because of their epigenetic significance such as ubiquitination of proteins, modification of

histones and C-terminal lipidation of proteins by semisynthetic approaches. In this context, strong emphasis was placed on optimization of existing synthetic methodology and development of new chemoselective procedures for the specific modification of peptides and proteins. The progresses achieved most recently in the field are presented in this special issue of *Journal of Peptide Science* in the form of Review articles covering selected aspects discussed in the main lectures as well as Research articles addressing specific advances in different methodologies.

The keynote lecture at the Schloss Ringberg meeting was given by Mohamed Marahiel (Philips University, Marburg) on non-ribosomal peptide synthesis, showing that this peptide synthesis machinery will be an important addition to the wide repertoire of chemical synthesis of peptides and proteins (for his recent review article on the subject refer *J Peptide Science* 2009: **15**; 799–807).

The diverse themes discussed in last year's international conference on Probing Protein Function through Chemistry have shown that the methods and techniques are presently so established that interesting and important biological questions can now be effectively addressed by chemistry.

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