

Preface

Introduction: Special Issue on Aquaporins

Since the pioneering discovery of the first water channel (aquaporin-1) in 1991 by Peter Agre, Nobel Prize laureate for chemistry in 2003, research on the aquaporins has grown tremendously. Although the number of publications on aquaporins was low in the early 1990s, it increased to around 170 in 1999 and to almost 400 in 2005. This increase is attributable to several factors. At first, while the early papers focussed on the identification of new members of the aquaporin gene family, their localization and their function in mammals, it became clear later that aquaporins play important roles in organisms ranging from bacteria and yeast to animals and plants. Also it became evident that, in addition to the aquaporins that are selective for water, other isoforms were also permeable to compounds such as urea and glycerol—leading to a split of the family into aquaporins and aqua-glyceroporins. Despite the strong sequence resemblance, this difference in selectivity ignited research to discover the atomic structures of these channels. Moreover, the recent identification of the important pathophysiological role of several aquaporins in water homeostasis of different organs and in fat metabolism has made the scientific community and the pharmaceutical industry increasingly aware of the potential of aquaporin-modulating compounds to treat or prevent development of disorders in water homeostasis and fat metabolism.

On September 10 to 13, 2005, we had the pleasure of organizing the 4th International Conference on Aquaporins in Genval, Belgium. The meeting brought together nearly 250 scientists from more than 40 countries, specialized in research fields embracing structural biology, mathematic modelling, molecular biology, genetics, (patho)physiology, pharmacology and medicine, in microbes, plants, yeast, animals and humans. In addition to being at a fantastic location, the meeting was

characterized by the broad interests of the participants in all aspects of aquaporin research and the lively and open discussions during and after scientific sessions. We hope that these discussions will stimulate the many young participants who attended the meeting to pursue a scientific career in the exciting field of aquaporin research. To taste a bit of the progress, broadness and quality of up-to-date research in the aquaporin field, several participants at the meeting were invited to submit an original or review manuscript to this special issue of *Biochimica Biophysica Acta—Biomembranes*, dedicated to the 4th International Conference on Aquaporins. We were thrilled by the high number of respondents and the quality of the work submitted. All contributions were thoroughly peer-reviewed. We are grateful to the distinguished contributors who accepted our request to elaborate on their area of expertise both in their presentations at the meeting and in the original and review papers presented here. We also thank all the sponsors of the conference, particularly the main sponsor Spadel, as well as the editorial staff at *BBA* for their enthusiasm and outstanding support.

The organizing committee hopes that the collection of papers in this special issue will illuminate the diversity and importance of aquaporins in all aspects of biology.

The Local Scientific Committee

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