

类脂双层 (BLM) 概念及其实验进展——BLM的40年

The Lipid Bilayer Concept and Its Experimental Realization

投稿时间: 2000-11-20 最后修改时间: 2001-2-20

稿件编号: 20010403

中文关键词: [双分子类脂膜](#) [化学传感器](#) [自组装](#) [界面现象](#) [重组](#)

英文关键词: [bimolecular lipid membranes](#) [biosensors](#) [self-assembly](#) [interfacial phenomena](#) [reconstitution](#)

基金项目:

| 作者 | 单位 |
|------------------------------|--|
| 毕只初 | 中国科学院化学研究所分子科学中心胶体和界面实验室, 北京 100080 |
| H. T. TIEN | Membrane Biophysics Laboratory, Department of Physiology, Michigan State University, East Lansing, Michigan 48824, USA |
| A. L. OTTOVA | Membrane Biophysics Laboratory, Department of Physiology, Michigan State University, East Lansing, Michigan 48824, USA |

摘要点击次数: 93

全文下载次数: 6

中文摘要:

类脂双层研究的动力是来自生物世界. 虽然1961年首次报道生物体外的双层类脂膜 (BLMs) 自组装, 但从Hooke (1672年)起, 实验科学家一直在处理有关BLM类型的界面吸附现象. BLMs (或平面的类脂双层) 已应用在许多方面, 即从基础的膜生物物理学到实际的爱滋病研究, 从通过水光分解的太阳能转换, 到应用支持双层类脂膜 (s-BLMs) 的生物传感器的发展, 到包括细胞凋亡 (apoptosis) 在内的光生物学. 综述了类脂双层概念的起源及其实验进展, 以及BLMs用作某些生物膜模型的最新研究. 此外, 简要描述近来有关通过s-BLMs来发展生物传感器的工作.

英文摘要:

The development of conventional BLMs (planar lipid bilayers) and later s-BLMs and sb-BLMs, have made it possible for the first time to study, directly, electrical properties and transport phenomena across a 5 nm ultrathin film separating two phases, in particular as models of biomembranes. As a result of extensive studies over the past 4 decades, biomembranes have now been recognized as the basic structure of Nature's sensors and molecular devices. To impart relevant functions in BLMs, a variety of compounds such as ionophores, enzymes, receptors, pigments, tissues, etc. have been embedded. Some of these incorporated compounds cause the BLMs to exhibit non-linear phenomena and photoelectric effects. The self-assembled lipid bilayer, the most crucial component of all biomembranes, is in a liquid-crystalline and dynamic state. Such a system, as we know intuitively, must act as some sort of a transducer capable of gathering information, processing it, and then delivering a response based on this information. Today, planar lipid bilayer research is a matured field of endeavor, as a result of applications of many disciplines and techniques including interfacial chemistry, electrochemistry, patch-clamp techniques, spectroscopy, microelectronics, and others. In membrane reconstitution experiments, for example, the evidence is that intracellular signal transduction begins at membrane receptors. The research area covered in this paper is highly interdisciplinary. Emphasis has been placed on basic research. The past work has been benefited by a cross-fertilization of ideas among various branches of sciences. The biomimetic approach to practical applications is unique and full of exciting possibilities. We can glean the design principles from Nature's successful products and apply them to our research and development from which molecular medicine and advanced biosensors may ultimately depend.

[查看全文](#)

[关闭](#)

[下载PDF阅读器](#)

您是第385076位访问者.

主办单位: 中国科学院生物物理研究所和中国生物物理学会 单位地址: 北京市朝阳区大屯路15号
服务热线: 010-64888459 传真: 010-64889892 邮编: 100101 Email: prog@sun5.ibp.ac.cn
本系统由勤云公司设计, 联系电话: 010-62862645, 网址: <http://www.e-tiller.com>

京ICP备05002794号