DOI:10.16262/j.cnki.1000-8217.2010.04.006

REVIEW OF THE ACHIEVEMENTS OF MAJOR PROGRAM ON "SOME FRONTIER ISSUES ON THEORETICAL PHYSICS AND ITS INTERDISCIPLINARY SCIENCE" SUPPORTED BY NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA

Ouyang Zhongcan[1] Wan Meixiang[2] Chen Runsheng[3] Zhao Guangda[4]
Tao Ruibao[5] Huang Tao[6] Mei Liangmo[7] Peng Kunchi[8]

(1 *Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing* 100080;
2 *Institute of Chemistry, Chinese Academy of Sciences, Beijing* 100190;
3 *Institute of Biophysics, Chinese Academy of Sciences, Beijing* 100101;
4 *School of Physics, Peking University, Beijing* 100871; 5 *School of Physics, Fudan University, Shanghai* 200433;
6 *Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing* 100049;
7 *School of Physics, Shandong University, Jinan* 250100;
8 *School of Physics and Electronics Engineering, Shanxi University, Taiyuan* 030006)

Abstract This paper reviews the 8-year implementation and achievements of a major program on "Some frontier issues on theoretical physics and its interdisciplinary science"supported by National Natural Science Foundation of China. The Innovative achievements made by the participants and their contributions to resolving the core scientific issues are also addressed.

Key words major project, theoretical physics, interdisciplinary science, the original innovation, international competitiveness

·资料·信息·

国家自然科学基金重大项目"禽流感关键基础科学问题研究"通过结题验收

国家自然科学基金重大项目"禽流感关键基础科学问题研究"通过了结题验收。该项目在禽流感病毒分子流行病学、病毒蛋白结构与功能、感染机制与免疫应答、禽流感病毒感染人的特点与传播途径等方面都取得了原创性的结果，圆满完成了计划任务，为进一步开展流感基础研究、流感疫苗的研制、药物开发提供了新的思路，受到专家组的好评，获得了特优的综合评价。

历经4年研究，课题组阐明了近年来流感病毒在多种动物和人中的分子流行病学特征与进化变异规律；解析了H5N1病毒RNA聚合酶部分亚基的结构，发现了PA的新功能，为抗流感病毒药物设计提供了潜在的新靶点；发现了流感病毒NS1蛋白在调控PKR信号通路中的作用；首次报道了流感病毒感染引起人肺上皮细胞自噬，发现自噬抑制剂可以抑制流感病毒的复制；鉴定了第一个具生物学功能的H5N1病毒CTL表位，为进一步研究病毒感染与宿主细胞免疫应答、生物标记诊断与新型疫苗研发提供了新的信息；基于病毒膜融合机制，设计和筛选出一种能抑制流感病毒膜融合的多肽抑制剂；发现了H5N1病毒可以通过胎盘进行母婴传播，人肠道细胞存在禽流感病毒α-2,3半乳糖苷唾液酸受体。

通过项目的实施，课题组凝聚了国内跨学科领域的研究人才，形成了具有国际竞争力的团队，开展了与国内外同行的广泛交流与合作，多次组织相关国际会议，引起了国内外同行的关注。

（生命科学部 供稿）