

First KIA Laureate Applied Research



- ◆ **Researcher:** Prof. Didier Raoult
- ◆ **Nationality:** French
- ◆ **Date of birth:** 1952
- ◆ **Position:** Professor and Director of Laboratory
- ◆ **Scientific affiliation:** Faculty of Medicine and Timone Hospital, Marseille, France

Project title: Clinical microbiogenomics of emerging pathogens

Abstract: With the advent of new technologies, the number of recently recognized pathogens is increasing dramatically. In this project, we propose to search for new bacterial and viral pathogen using specific cell cultures and massive sequencing (metagenomics of samples and genomics of isolated organisms). This will make possible to design new tools for testing a large collection of samples from patients with identified pathology. We will focus on bacterial metagenomics of samples from patients with mixed infection (cerebral abscess, lung infections in patients with cystic fibrosis, bone infections), viral metagenomics of patient with nosocomial pneumonia without identified etiology, viral metagenomics of plant viruses from food, and isolation and sequencing of new microorganisms such as giant viruses from the water (by amoeba co-culture), intracellular bacteria (a new *Coxiella* species, and a new *Neorickettsia* species) and new multiresistant bacteria isolated from our 3,500 bed hospital. We expect to identify 100 new pathogens (original sequences or isolates) in the next 3 years. We will design molecular target and identify, by immunoproteomics, proteic antigens for intracellular bacteria. The new pathogens will be tested in multiplexed assay (based on serology or PCR) in our collection of samples obtained and stored following regular diagnostic procedures

Biography: Prof. Raoult run the leading world laboratory for intracellular bacteria, have 1380 references in Pubmed, run the largest clinical microbiology laboratory in France and has been the mentor of many students. He was first to grow *T. whipplei* and in vitro and many rickettsiae, he described first many rickettsial diseases. Prof. Raoult, Md-PhD, was first trained in internal medicine then in tropical medicine and infectious diseases. He is a rickettsiologist, ie a microbiologist able to grow very fastidious organism. As such he participates to the discovery of several new species and diseases including *R. africae* and African tick bite fever, *R. slovaca*, *R. mongolotimonae* and *R. aeschlimanii*. He described new techniques to grow fastidious bacteria that allows the first reproducible growth of several bacteria such as *R. felis* and *T. whipplei*. He participated to the discovery /first description of over 60 pathogens. He also described diagnostic tools (including serology and PCR) and antibiotic susceptibility testing of these organisms. He proposed new therapeutic strategies for rickettsial diseases and specifically Q fever. Recently, he reported the complete genome sequence of *Rickettsia conorii*, *Rickettsia felis* and *T. whipplei* and the discovery of the biggest virus identified to date (Mimivirus). He also reported the isolation of new microorganisms, resisting to water amoebae, as pneumonia agents. He developed the use of dental pulp to identify the agent of ancient diseases including plague and typhus. He received several awards in France, the excellence award of the ESCMID 2002 and Trop Medecine award of Royal Academy of Belgium and give the Smadel lecture at the IDSA in 2003. He is full professor of medicine and was president of Marseille's University for 5 years. He was the consellor of the french ministry of health for infectious diseases and bioterrorism for 2 years. He lead french National Reference Center for Rickettsial diseases and a WHO reference center for arthropod borne bacterial diseases. He wrote most of the chapters on Rickettsial diseases in reference books (Bergey's Manual, Harrison, Mandell). A bacterial genus *Raoultella* was created in his honor.