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Cell engineering and antibiotic-free selection for vaccinal antigens production in *E. coli*: The ultimate sophistication to combine safety and productivity

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A large number of next-generation vaccine candidates are from bacterial origin and a significant number of viral antigens or VLP-like structures can be produced in *E. coli*. New means of *E. coli* engineering will give access to increasing possibilities in a mid-term future. In addition, *E. coli* is well known from health authorities and adaptable to antibiotic-free selection. The increasing regulatory requirements to which biological agents are subjected currently have a great impact in the field of industrial protein expression and production. The expectation is that in a near future, there may be "zero tolerance" towards antibiotic-based selection in production systems. Besides the antibiotic itself, the antibiotic resistance gene is an important consideration. The complete absence of antibiotic-resistance gene being the only way to ensure that there is no propagation in the environment or transfer of resistance to pathogenic strains. We have proposed and validated, at both laboratory and pre-industrial scale, a general strategy combining natural plasmid stabilisation and antibiotic-free selection based on post-segregational killing. The novel host/vector system, obtained through combined genomic and plasmid engineering is completely devoid of antibiotic resistance gene and brings the additional advantage of improving recombinant protein expression and/or plasmid recovery. A marked increase in genetic stability and robustness, over high stress fermentation conditions has been demonstrated.

Biography

Regis Sodoyer has PhD in Organic Chemistry and in Molecular Immunology. He completed his PhD in Organic Chemistry at University of Nice in 1980. Then he joined the CIML (Centre d'Immunologie INSERM/CNRS de Marseille Luminy) in Marseille, where he directed his research to the Polymorphism and structure-function relationships of HLA class I genes of the Human Major Histocompatibility Complex. After that he joined Sanofi Pasteur, the vaccine division of the Sanofi Aventis Group in 1986. He spent more than 25 years in the research department occupying different positions, namely: Group leader, Head of Molecular Microbiology platform, Head of Experimental Design & Modelisation Platform and finally Director for Technology Innovation. He recently moved to Bioaster to provide expertise in the Technology Innovation Center "New Tools for Bioproduction". His different fields of expertise are: Vaccinology, molecular biology, immunology, antibody engineering, phage display and expression systems for the production of recombinant vaccinal antigens.

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