



Rino Rappuoli

Dr. Rino Rappuoli, PhD, is Global Head of Vaccines Research at Novartis Vaccines and Diagnostics, based in Siena, Italy. He earned his PhD in Biological Sciences at the University of Siena and has served as a visiting scientist at Rockefeller University in New York and Harvard Medical School in Boston.

He is member of European Molecular Biology Organization and foreign associate of the American National Academy of Sciences.

Published more than 450 works in peer-reviewed journals.

He introduced several novel scientific concepts, the names of which became popular. Examples are the concept that bacterial toxins can be detoxified by manipulation of their genes (***genetic detoxification, 1987***), the concept that microbes are better studied in the context of the cells they interact with instead of artificial laboratory conditions (***cellular microbiology, 1996***), the use of genomes to develop new vaccines (***reverse vaccinology, 2000***), the observation that the genome of a species (***pangenome, 2005***) is larger than the genome of an organism of the same species.

Several molecules he worked with became part of licensed vaccines. He characterized a molecule, ***CRM197***, that today is the most widely used carrier for vaccines against *H. influenzae*, *N. meningitidis* and pneumococcus vaccines, and is used multiple times to vaccinate most children of the globe. Then he developed a ***vaccine against pertussis*** by engineering *B. pertussis* to produce a non toxic pertussis toxin antigen. This was the first rationally designed molecule approved for human use. Later he developed the first ***conjugate vaccine against meningococcus C*** that eliminated the disease in the UK in 2000. He pioneered the use of genomic information for vaccine development (reverse vaccinology). The first genome-derived vaccine against ***meningococcus B*** is now in Phase III clinical trials, several others are in earlier stages of development. Finally, in 1997 he obtained the regulatory approval for ***MF59***, the first vaccine adjuvant approved for human use after the approval of aluminium salts in the 1920s. MF59 is now being used in many other experimental vaccines, the most advanced of which is a vaccine against pandemic influenza.