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## Defeating meningococcal disease: From a glycoconjugate vaccine against MenACWY to a protein-based vaccine against meningococcus B

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*Neisseria meningitidis* is the leading cause of meningitis and sepsis in children and adolescents. Based on the chemical composition of the capsular polysaccharide, *N. meningitidis* can be distinguished into 12 serogroups, however >95% of disease cases are caused by 5 serogroups (MenA, B, C, W and Y). The first vaccine against meningococcal disease was based on the conjugation technology, where the MenC capsular polysaccharide was conjugated to a carrier molecule. This vaccine was highly efficacious and contributed to reduce the burden of disease in UK, where it was first introduced, and in all the other countries where it was later implemented. Following this success, the same approach was applied to serogroups A, W and Y and a multicomponent MenACWY vaccine was developed. This strategy was not feasible for serogroup B and therefore a broad spectrum vaccine against meningococcus B has long remained elusive. An innovative approach, termed Reverse Vaccinology was coined in early 2000 and applied to MenB with the aim to identify sub-capsular antigens for the development of a universal vaccine against this important serogroup. Potential candidates were selected and used for the generation of the multi-component vaccine formulation termed 4CMenB, recently licensed in Europe with the commercial name of Bexsero. 4CMenB is composed of three recombinant protein antigens (Factor H binding protein fHbp, the Neisserial Heparin binding antigen NHBA and the Neisserial adhesin A NadA) plus purified outer membrane vesicles (OMV) of the epidemic New Zealand strain. 4CMenB has been shown to be highly immunogenic in human subjects of different age groups and holds the promise for the elimination of this devastating disease.

### Biography

Vega Massignani joined Chiron Vaccines (now Novartis Vaccine and Diagnostics) division in Siena in 1995. She got her PhD in Biotechnology in 2000 and since then she has always worked in the Research Department. She was involved in the Meningococcus B vaccine project since the very beginning and participated in the identification of the protein candidates that are today included in the recently licensed Bexsero vaccine. From 2005 to 2010 she has worked as Project Leader of the *Streptococcus pneumoniae* vaccine project and has contributed to the identification and characterization of the pneumococcal pilus, an important factor involved in bacterial pathogenesis. Since 2010, she is Project Leader of the MenB project and is responsible for all the activities that are carried out in Research to further elucidate the role of the Bexsero antigens.

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