

THE NOBEL PRIZE IN CHEMISTRY 2018



Frances H. Arnold
(Born in 1956, Pittsburgh, USA)
California Institute
of Technology, Pasadena, USA



George P. Smith
(Born in 1941, Norwalk, USA)
University of Missouri,
Columbia, USA



Sir Gregory P. Winter
(Born in 1951, Leicester, UK)
MRC Laboratory of Molecular
Biology, Cambridge, UK

The Royal Swedish Academy of Sciences has awarded the Nobel Prize in Chemistry 2018 with one half to **Frances H. Arnold** “for the directed evolution of enzymes” and the other half jointly to **George P. Smith** and **Sir Gregory P. Winter** “for the phage display of peptides and antibodies”.

One half of this year’s Nobel Prize in Chemistry is awarded to **Frances H. Arnold**. In 1993, she conducted the first directed evolution of enzymes, which are proteins that catalyse chemical reactions. Since then, she has refined the methods that are now routinely used to develop new catalysts. The uses of Frances Arnold’s enzymes include more environmentally friendly manufacturing of chemical substances, such as pharmaceuticals, and the production of renewable fuels for a greener transport sector.

The other half of this year’s Nobel Prize in Chemistry is shared by **George P. Smith** and **Sir Gregory P. Winter**. In 1985, George Smith developed an elegant method known as phage display, where a bacteriophage – a virus that infects bacteria – can be used to evolve new proteins. Gregory Winter used phage display for the directed evolution of antibodies, with the aim of producing new pharmaceuticals. The first one based on this method, adalimumab, was approved in 2002 and is used for rheumatoid arthritis, psoriasis and inflammatory bowel diseases. Since then, phage display has produced antibodies that can neutralise toxins, counteract autoimmune diseases and cure metastatic cancer.

We are in the early days of directed evolution’s revolution which, in many different ways, is bringing and will bring the greatest benefit to humankind.