

# Invited talk on “Nobel Prize in Chemistry - 2018”

Date: 23-01-2019

Participants: 254

Resource person: Prof. Anju Chaddha, Department of Biochemistry, IIT, Chennai



**Speaker**

**Prof. Anju Chaddha**  
Institute Chair Professor  
Department of  
Biotechnology,  
IIT, Chennai

**Date**

23<sup>rd</sup> January, 2019  
Wednesday

**Time**

11:00 am

**Venue**

Sir P. T. Sarvajanik  
College of Science,  
Surat



**Chemistry Club**  
**Department of Chemistry**  
**Sir P. T. Sarvajanik College of Science**

Cordially invites you to  
The Public Lecture

**“Nobel Prize in Chemistry-2018”**  
**Subject Background**

Since the first seeds of life arose around 3.7 billion years ago, almost every crevice on Earth has filled with different organisms. Life has spread to hot springs, deep oceans and dry deserts, all because evolution has solved a number of chemical problems. Life's chemical tools – proteins – have been optimized, changed and renewed, creating incredible diversity.

This year's Nobel Laureates in Chemistry have been inspired by the power of evolution and used the same principles – genetic change and selection – to develop proteins that solve mankind's chemical problems.

One half of this year's Nobel Prize in Chemistry is awarded to Frances H. Arnold. She conducted the first directed evolution of enzymes in 1993, 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.



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### Brief Report:

The power of evolution is revealed through the diversity of life. The Nobel Laureates in Chemistry, 2018 took control of evolution and used it for purposes that brought the greatest benefit to humankind. Enzymes produced through directed evolution are used to manufacture everything from biofuels to medicines. Antibodies evolved by using a method called phage display can combat autoimmune diseases and in some cases cure metastatic cancer. This year's Nobel Laureates in Chemistry were inspired by the power of evolution and used the same principles -- genetic change and selection -- to develop proteins that solve humankind's chemical problems.

One half of this year's Nobel Prize in Chemistry was 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 had refined the methods which are now routinely used to develop new catalysts. The other half of this year's Nobel Prize in Chemistry was 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. All this information was explained in a lucid language by Prof. Anju Chaddha.