

THE  
NOBEL  
PRIZE

# CHEMISTRY PRIZE 2018

Nobel Prize Lessons



# The Nobel Prize in Chemistry

Since 1901

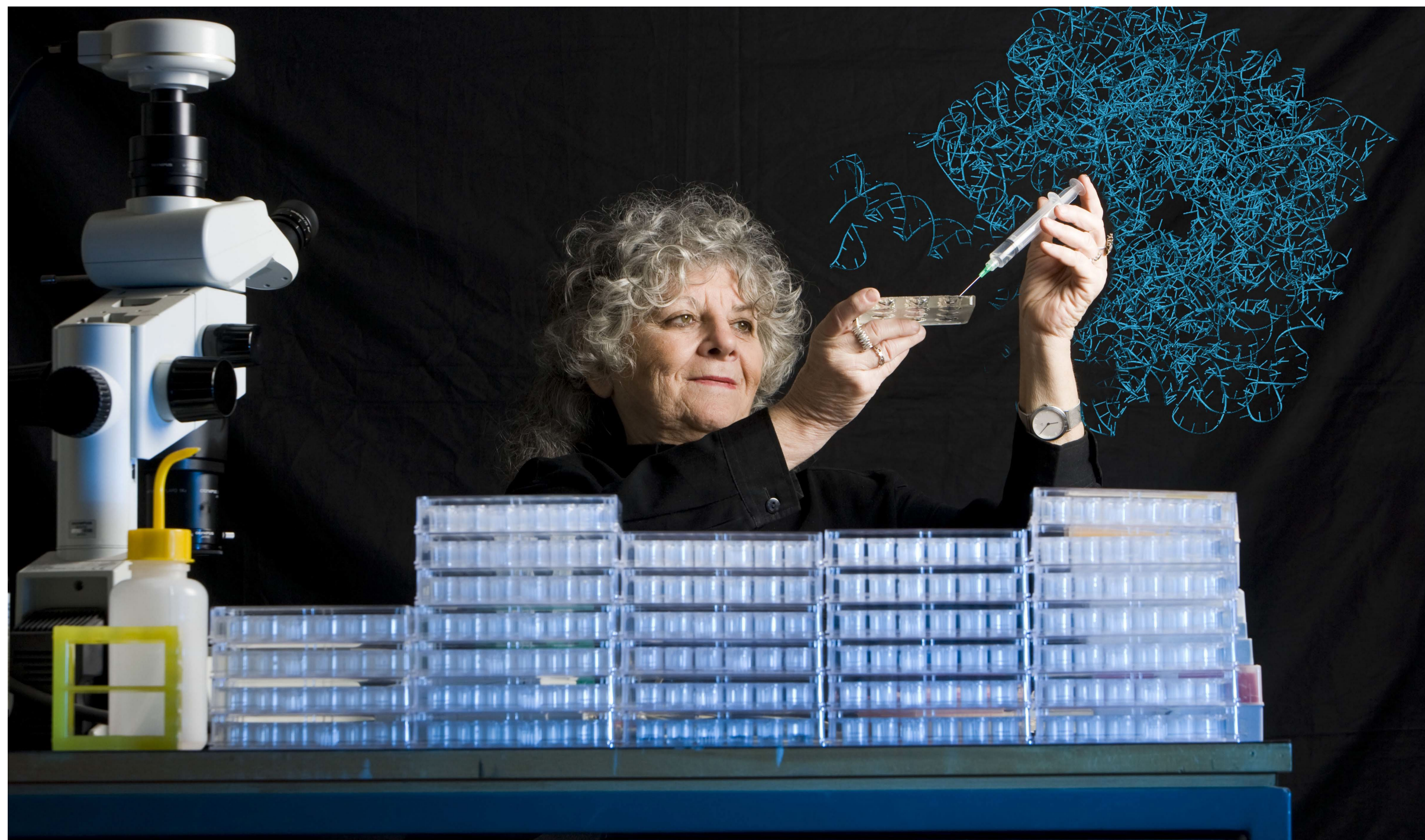
*"...the person who have  
made the most important  
chemical discovery or  
improvement".*





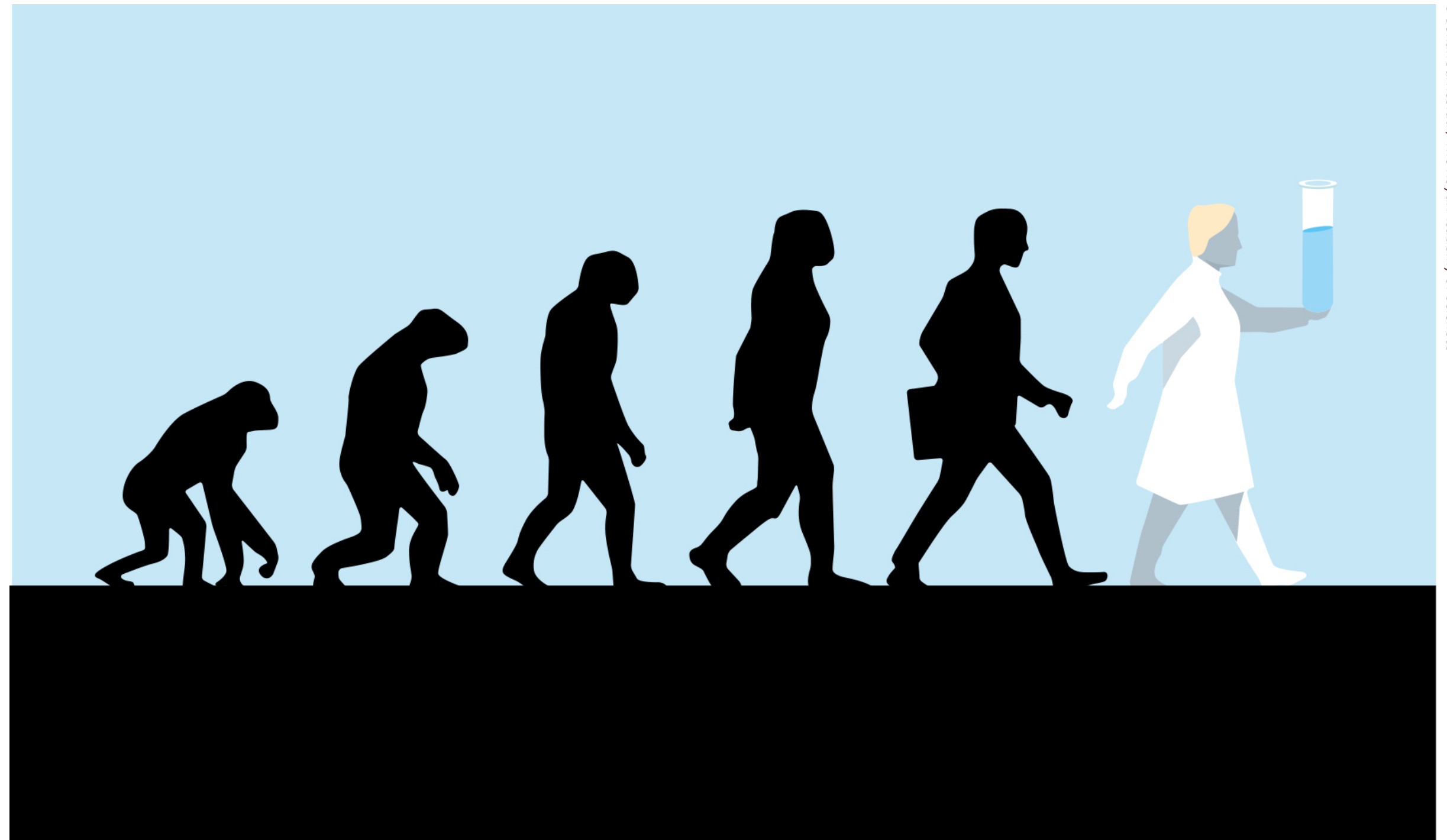
# Who is rewarded with the Chemistry Prize?

People who have made discoveries or improvements that have given us knowledge about the structure of various substances and how they are created and changed.



# Chemistry Prize 2018

Methods for producing useful new enzymes and antibodies, and a way of finding unknown genes.



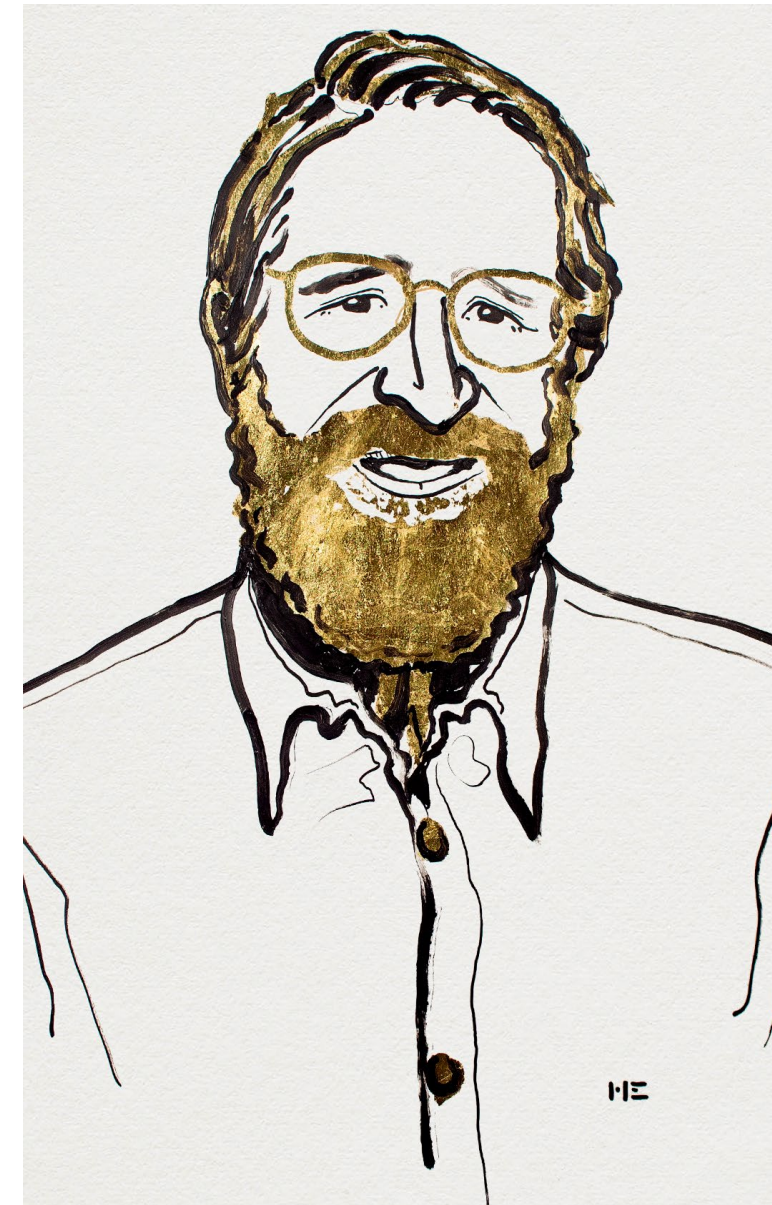


# The Nobel Laureates

“for the directed evolution of enzymes” and “for the phage display of peptides and antibodies”



Frances H. Arnold



George P. Smith



Sir Gregory P. Winter

# Genes code for proteins

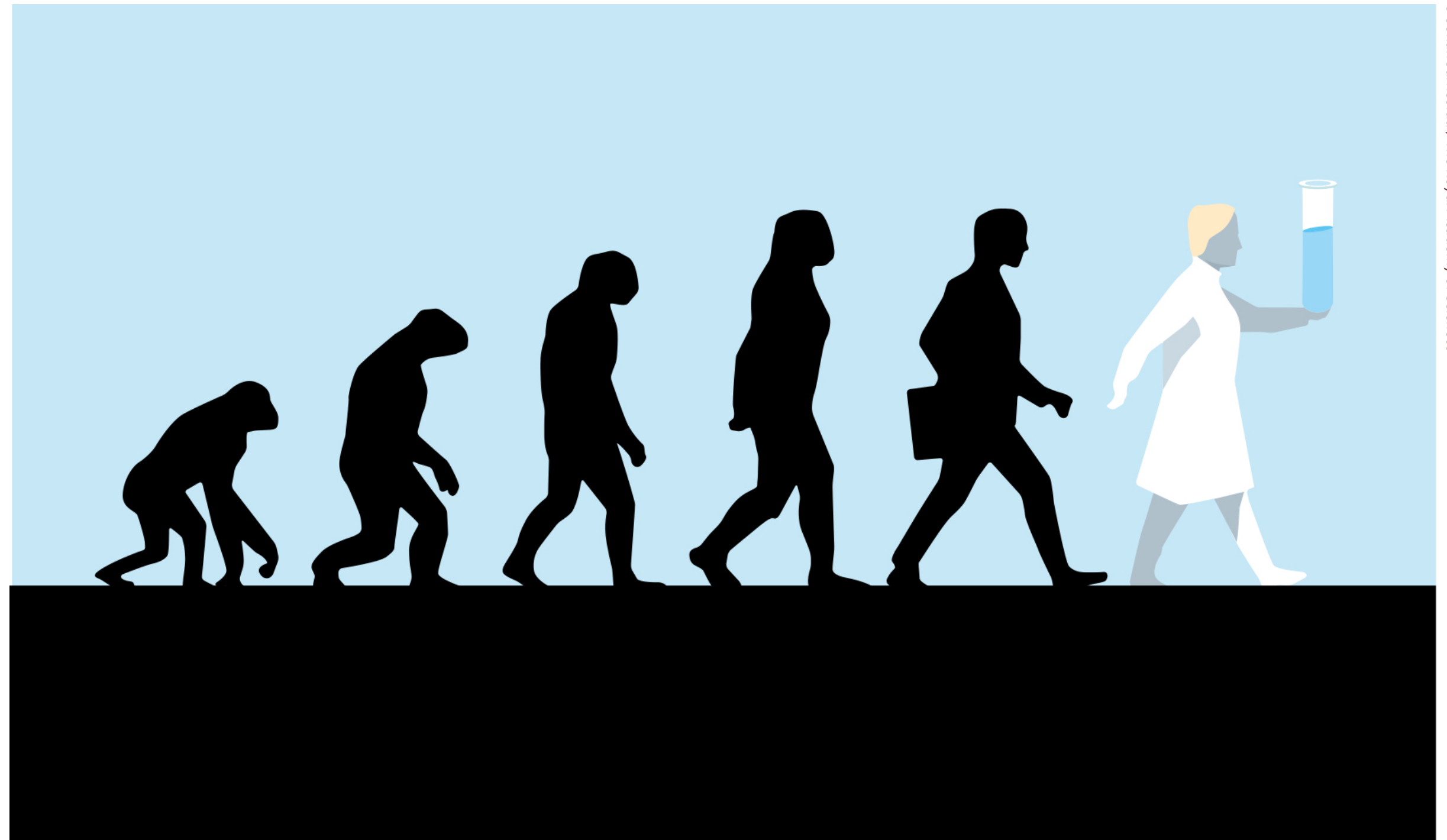
The genome (genetic material) consists of DNA and contains genes. Genes determine the structure of all proteins in an organism, thus controlling how it looks and functions.





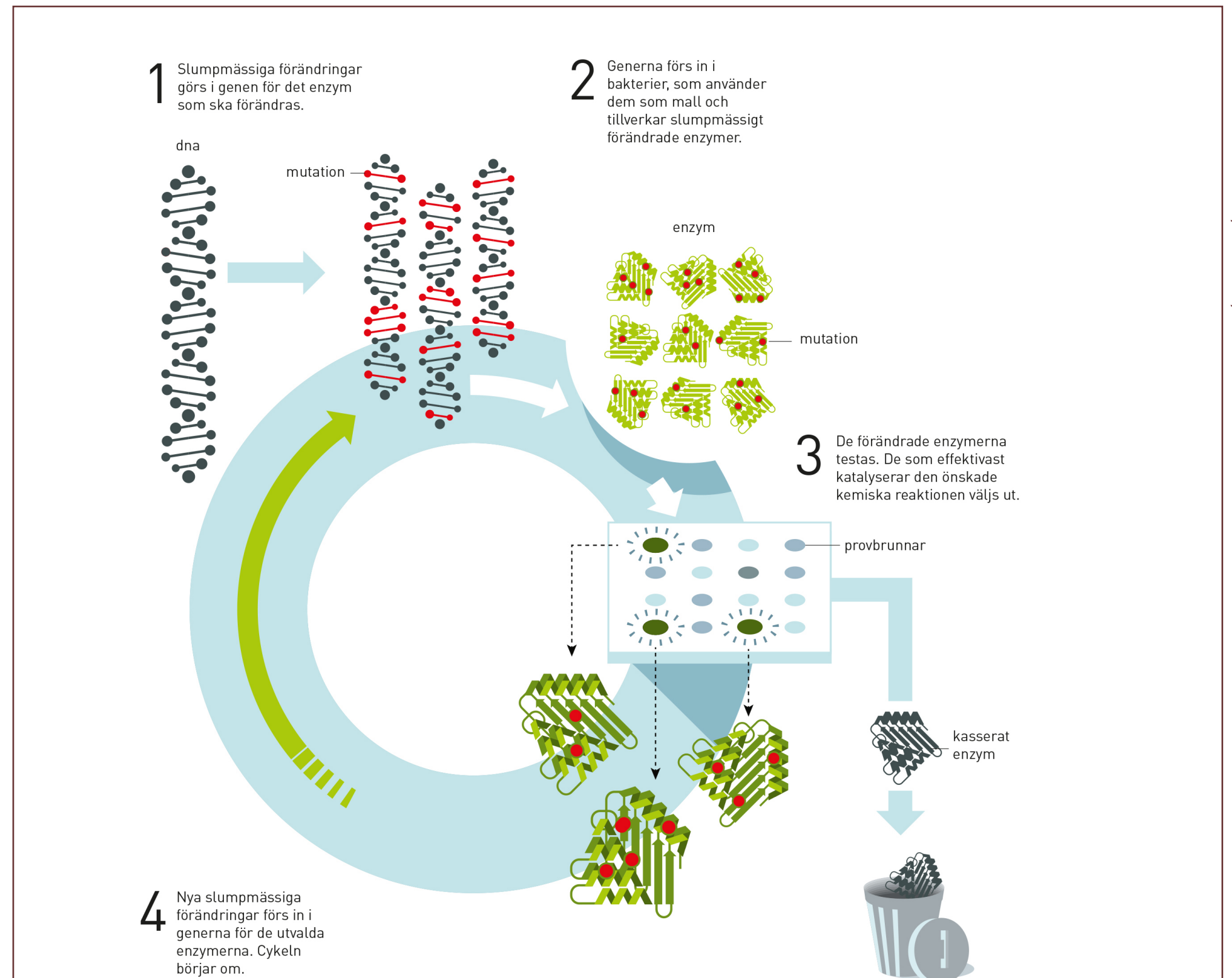
# Evolution

Evolution means that species change from one generation to another, in order to adapt to their surroundings.



# Directed evolution of enzymes

The principle for the directed evolution of enzymes. After a few cycles, an enzyme may be several thousand times more effective.





# Phage display

A method for finding an unknown gene for a known protein.

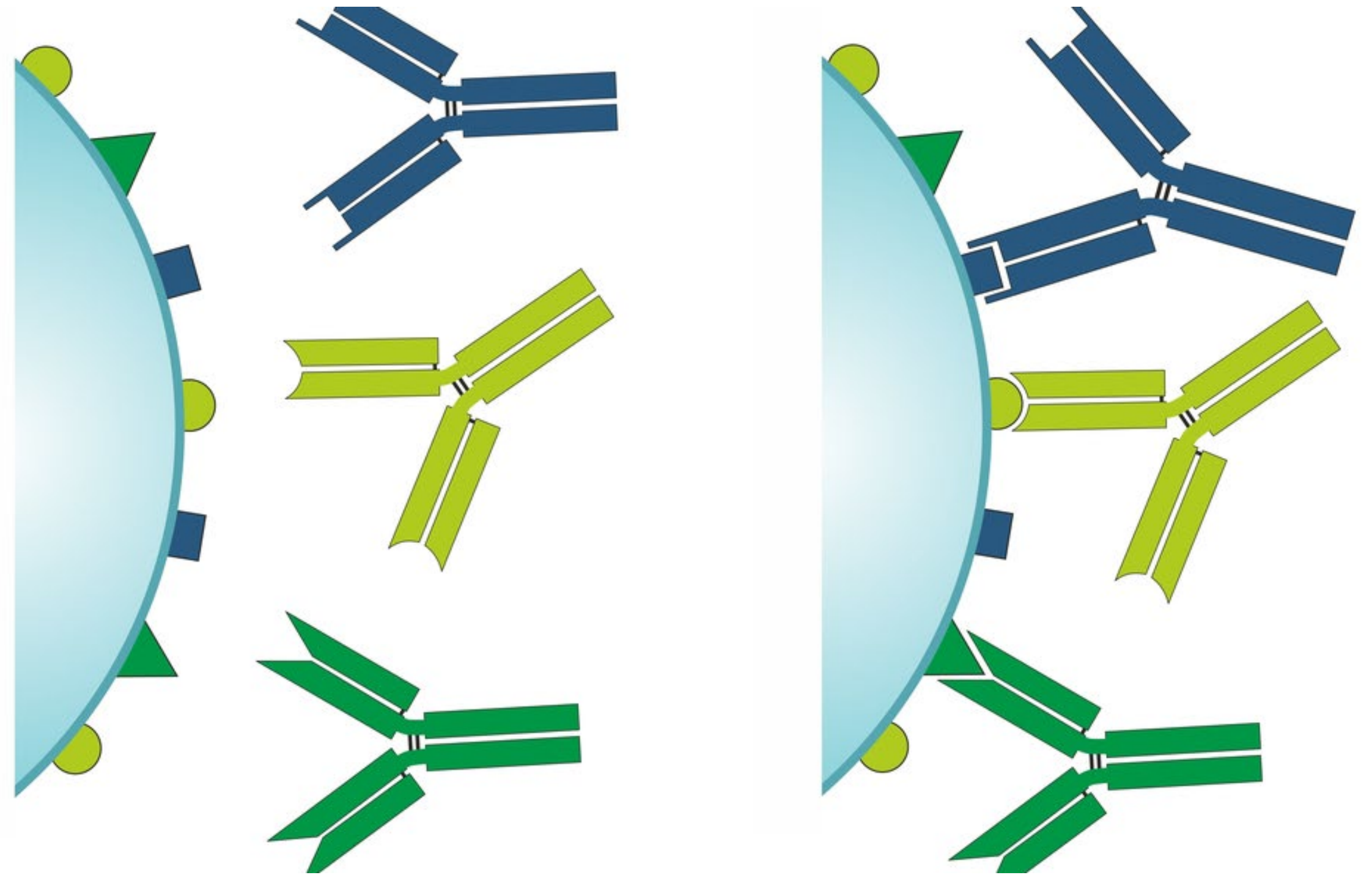


Photo: Marjorie R. Sable



## Antibodies as medicines

Antibodies can be produced by means of directed evolution. These antibodies can be used as pharmaceuticals that combat certain diseases.





## The benefits

Enzymes developed by means of directed evolution are used in making everything from biofuel to pharmaceuticals. Antibodies developed by employing the phage display method can cure diseases.





THE  
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FOR THE GREATEST  
BENEFIT TO HUMANKIND

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