

Carolyn Bertozzi receives Dr H.P. Heineken Prize for Biochemistry and Biophysics 2022



Carolyn Bertozzi
Photo: Bram Belloni



Amsterdam, 1 June 2022 – Carolyn Bertozzi, professor of Chemistry and, by courtesy, Chemical & Systems Biology at Stanford University, will be awarded the Dr H.P. Heineken Prize for Biochemistry and Biophysics 2022. The award honours Bertozzi's ground-breaking research into communication between cells and methods of influencing this communication.

The Heineken Prizes are the Netherlands' most prestigious international science prizes. Every two years they are awarded to five distinguished researchers. The Royal Netherlands Academy of Arts and Sciences is responsible for the nomination and selection process. During the first week of June, a 2022 laureate will be announced every weekday. Previous laureates of the Dr H.P. Heineken Prize for Biochemistry and Biophysics include Bruce Stillman (2020), Xiaowei Zhuang (2018) and Jennifer Doudna (2016). The award was established in 1964 by Alfred H. Heineken.

Bertozzi has developed a technique that enables immune cells to recognise cancer cells as dangerous and attack them

About the study

Our cells communicate with each other through molecules on the cell surface. Sugar molecules, also known as glycans, play an important role in this process. Bertozzi is developing chemical methods to study and influence the cell surface. Immune cells, for example, can tell from these sugars whether a cell is healthy or diseased. Amongst other things, her research shows that cancer cells fool immune cells by presenting a specific sugar molecule on the cell surface. With techniques from her lab, these sugar molecules can be 'mowed down', making immune cells recognise the cancer cells as dangerous and attack them. This is a major breakthrough in the treatment of cancer through immunotherapy that is currently being tested in patients.

Recent development

Recently, Bertozzi's group discovered a new strategy to attack harmful extracellular molecules that cause disease. Conventional drugs for this often consist of monoclonal

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antibodies, which block harmful molecules by binding to them. But with some harmful molecules, this does not work. That is why Bertozzi and colleagues developed a way to not just block these molecules, but to ensure that they are taken into a cell and completely broken down there.

Jury praises Bertozzi's role as founder of a new field

Bertozzi has developed more techniques to affect the cell surface and the inside of the cell, in living animals, grouped together under the name 'bioorthogonal chemistry'. Bioorthogonal chemistry, founded by Bertozzi, has developed into a major field of study. Laboratories all over the world use these techniques to study and influence interactions between cells. The jury, chaired by Albert Heck, professor of chemistry and pharmaceutical sciences at Utrecht University, calls this concept one of the few truly transformative developments at the interface of chemical and life sciences. Bertozzi bridges the gap between chemistry and biology as well as between the laboratory and the patient. This proves her great contribution to translational research, in which she is a pioneer in the translation of results from fundamental research to practical application.

Role model for LGBTQ+ in science

In addition to her work as a brilliant chemist, the jury has praised Bertozzi's activities regarding education for science and society, calling her an inspiring teacher, a successful entrepreneur, and a tireless advocate for the importance of science in everyday life as well as diversity in science. In particular her support of women and LGBTQ+ scientists. In addition, her research results are finding their way into medical applications.

About Carolyn Bertozzi

Carolyn Bertozzi (Boston, 1966) studied chemistry at Harvard University in the United States. She received her Ph.D., also in chemistry, from the University of California (UC) Berkeley in 1993. In 2002, she was appointed professor of Chemistry and Molecular Cell Biology there. In 2015, she moved from UC Berkeley to Stanford University and became professor of Chemistry and, by courtesy, of Chemical & Systems Biology. Her scientific work forms the basis of more than fifty patents and she is co-founder of several biotech companies, where her research results find their way into medical applications. In addition to the Dr H.P. Heineken Prize for Biochemistry and Biophysics, awards Bertozzi has received include the Wolf Prize, the Nagoya Medal, and the Solvay Prize.