Dr H.P. Heineken Prize for Biochemistry and Biophysics 2014 awarded to Christopher M. Dobson

Ladies and gentlemen,

As I speak, your body's cells are using their genetic code to build long strings of molecules. Those strings are called proteins, and they do wonders.

They fold themselves into many shapes and forms, which perform all sorts of functions. For instance, they carry oxygen in your blood and make your muscles move.

Folding up long strings is not easy, however. If the folding goes wrong, things get tangled up. If that happens in our body, it can cause trouble.

One misfolded protein string may snag other proteins, sticking them together into little clumps. Those clumps may travel through the body and get stuck somewhere. There, they may grow even bigger, gluing millions of molecules together into what we call 'amyloid plaques'. Such plaques can cause serious damage to the organism.

Fifteen years ago, researchers thought that amyloid plaques in the brain were a unique cause of Alzheimer's disease. Thanks to Dobson and his colleagues, many people now recognise that these plaques are but one example of misfolded proteins causing problems.

Dobson suggests that most human proteins are capable of misfolding. Our bodies keep things in check by letting the immune system remove misfolded proteins. When we get older, however, the immune system grows less efficient and amyloid plaques start to affect organs, causing all sorts of disease.

In the brain, amyloid plaques lead to Alzheimer's or Parkinson's. In the pancreas, they cause diabetes.

One day, these insights may have huge consequences. They may lead to new sorts of medicines, designed to help our bodies mop up misfolded proteins.

Dobson has made fundamental contributions to our understanding of key elements of protein folding. His insights came in part from his ability to look at the problem from many different angles. He did not limit himself to biochemistry but included fields such as nuclear magnetic resonance, spectroscopy and computer modelling. His creative experiments managed to bridge the gap between our knowledge of molecules in test tubes and the 'real world' of living cells.

Luckily he is still very active in research. Lately he has set his sights on entirely new fields such as materials science and nanotechnology.

Ladies and gentlemen, please join me in honouring Christopher Dobson, winner of the 2014 Heineken Prize for Biochemistry and Biophysics.