



**Heineken
Prizes**



K N A W

2016 Dr A.H. Heineken Prize for Medicine, awarded to Steve Jackson

Presentation speech by Christine Mummery, Chairperson of the 2016 Dr A.H. Heineken Prize for Medicine Jury

Ladies and gentlemen,

As we just heard Steve Jackson explain so eloquently, DNA in our cells is being damaged all the time.

From radiation, from chemicals or from natural causes, cells constantly accumulate errors in their genetic code.

Those errors require constant vigilance and repair.

But when one or more of these repair systems fail, the result is often a cancer cell that can no longer be controlled by the body.

One way to fight cancer cells would be to try and repair their repair mechanisms.

But there is also another, rather more surprising way.

The repair systems of cancer cells could be disrupted even further.

The cells would then accumulate even more damage, and could actually self-destruct.

This was the provocative idea developed by Steve Jackson.

And he is working hard to put his idea to a full test.

Throughout his career, Jackson has worked to understand the various repair mechanisms that a human cell has at its disposal.

Some of these repair small problems, rather like one typo being corrected among the thousands of letters in the genetic code.

Others have evolved to correct bigger problems, such as whole genes that have been completely disrupted.

But having a filled tool box is just one part of the answer.

Cells have to detect and diagnose errors in the first place, and then make sure they activate the right tool to repair the problem.

The clue is in finding the break and stitching two strands of DNA back together in exactly the right way.

Jackson has contributed much of what we now know about the repair going on inside our cells every second of every day.

In cancer cells though, the challenge is much greater: often one or more parts of the DNA repair systems have become defective.

Some cells begin to divide uncontrolled, producing ever more diverse collections of new cancer cells.

Some of these cancer cells are able to circumvent our current therapies and escape the death threat.

To fight exactly these cells, Steve Jackson developed an approach he called 'synthetic lethality'.

This is based on the idea that if new drugs could be found that caused even more damage to the repair systems, healthy cells would be in a better position to survive than cancer cells, where the repair is already defective.

Healthy cells, with a full box of tools, could still miss one or two without too much trouble, but for cancer cells, missing even more on top of those already gone could prove fatal.

Two years ago, the first cancer drug based on his work using this principle came on the market to treat a certain type of ovarian cancer.

As remarkable has been Jackson's success as a basic researcher in taking a potential new drug right through to clinical trials and into the market.

He is now investigating their potential use in other types of cancer.

Ladies and gentlemen,

Steve Jackson has made an impressive number of outstanding contributions to basic research into how cells respond to DNA damage.

He has identified drugs that interfere in the repair of DNA damage and has translated this knowledge into novel, successful cancer therapies.

Please join me and the jury in a round of applause for Steve Jackson, winner of the 2016 Heineken Prize for Medicine!