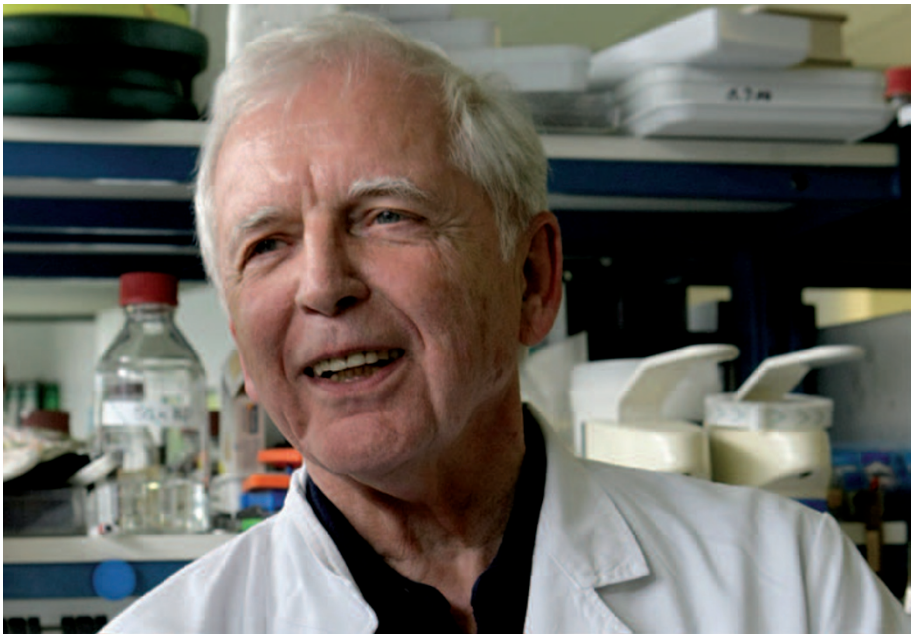

ALEX GRIMM/REUTERS/CORBIS

Harald zur Hausen
Science addict

Virologist at German Cancer Research Centre in Heidelberg. Joint winner of 2008 Nobel Prize in Physiology or Medicine for discovery of the role of human papillomavirus (HPV) in causing cervical cancer. zur Hausen was born in 1936 in Gelsenkirchen-Buer in Germany, an area that was heavily bombed during the Second World War.

At Lindau you gave a talk suggesting that colon cancer might be linked to a virus in cows, which could survive in raw or rare beef. How realistic is the threat that we might be harbouring unknown cancer-causing viruses?
It is a big problem, and it's a needle in a haystack. With the advance of sequencing techniques, we can expect the discovery of a large number of novel viruses in different human tissues, among them some cancer causing agents. But some viral infections occur at very low frequencies, so it is hard to find them. I am convinced there are a large number still awaiting detection.

The gut is a huge repository of microbes. Many viruses in the gut are bacterial viruses — bacteriophages. So it is a complicated story that will take a long time to disentangle. Plus it is a long way from initial isolation of a virus to final identification and determination of whether a virus is pathogenic or oncogenic. We need functional tests to determine the relationship between a virus and cancer. For instance, we started to work experimentally on HPV in 1972. We isolated HPV strains 16 and 18 (the oncogenic ones) in 1983 and 1984, so that took 11–12 years before we could be sure that those were the causative agents.

Many of the worlds most significant health challenges are caused, at least in part, by human behaviour. What is the role of science/medicine — along with psychology, behavioural and social sciences — in helping to change detrimental human behaviours?
All these sciences have to interact to some degree. If we could all avoid such things as smoking, overeating and heavy drinking then we have a good chance of reducing the burden of cancer globally. But, if we fully understand the factors underlying how smoking contributes to lung cancer, or how obesity can lead to diabetes or breast cancer, then this is the contribution from science and we have an opportunity to interfere through medication or in other ways.

If we consider that, for instance, smoking is a very bad idea, it then seems a little odd that we should seek to find cures to the many and complex diseases it causes at the expense of time, money and attention being dedicated to the behavioural sciences that might be more effective in reducing the incidence of the behaviours that lead to these diseases. There is a lot of effort developing evidence-based theory and techniques to change health-related and risky behaviours: education alone isn't sufficient.

Chris Martin, neuroscientist, Department of Oncology, University of Oxford, United Kingdom, who posed the original question on lindau.nature.com.

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At first, pharmaceutical companies were dismissive of an HPV vaccine — has your relationship with them improved?
My relationship with the pharmaceutical industry is not optimal. Of course, they're mainly interested in selling their products, and they are reluctant to develop products without a market. And for certain products, if there is not governmental support for development, then very little will happen.

Fortunately, there are foundations that do good work along those lines. They help support treatments for some diseases that do not play a significant role in the West. Rotavirus, for example, has a huge impact on mortality in less developed countries. Because of the support of these foundations, vaccines for rotavirus are reasonably cheap and can be distributed on a larger scale.

What has your relationship been like with your mentors over the years?
I don't think I have had one particularly influential mentor. Each of my mentors gave me a lot of freedom, which I enjoyed very much, so I have some difficulties to pick one out. But, I had a good time with Werner and Gertrude Henle at the Children's Hospital of Philadelphia.

While at the University of Düsseldorf early in my career, I wasn't getting much advice from my supervisor. I would go to him with crazy ideas, and he would say "sounds interesting, why don't you try it out?" I hated it at the time because I felt like I wasn't being trained. In retrospect, however, it was a very good, creative period. I worked on a lot of nonsense, but I was able to make my own mistakes. In addition, I had the freedom to look into a lot of different areas.

In turn, I tried to give my students a bit more freedom and to encourage them to develop their own ideas. These days I'm not accepting students any more as I'm 75 years old and I think it's a good time to stop taking them on.

Do you still spend long hours in the lab?
Whenever I can, including weekends. Science is like a drug — I'm an addict! ■