ULLSTEINBILD/BE&W

Harald zur Hausen – pictured here in his lab at the German Cancer Research Center in Heidelberg – won the 2008 Nobel Prize for his work on identifying the role of the human papilloma virus in the development of cervical cancer

Don't Believe Dogma

***Academia* had the opportunity to question Prof. Harald zur Hausen about his fascinating viral research leading to the development of a cervical cancer vaccine, about how great scientific discoveries are not always recognized right away, and also about his own plans for the future**

Last year the Royal Swedish Academy of Sciences awarded the Nobel Prize in physiology and medicine to Prof. Harald zur Hausen, a foreign member of the Polish Academy of Sciences, in recognition of his crucial contributions to our understanding of how viruses are involved in the development of certain forms of cancer, especially cervical cancer (a particularly dangerous and frequent type of cancer in women, which kills nearly 2,000 women every year in Poland alone). Prof. zur Hausen successfully demonstrated that cervical cancer is caused by the human papilloma virus, thus paving the way for the development of a vaccine to reduce the risk of contracting this form of cancer. When Prof. zur Hausen first tried to convince the research community and pharmaceutical firms that such a vaccine was possible back in the 1980s, his attempts nevertheless came up against skepticism. Fortunately recognition eventually did come, and now he is a worldwide authority on cancer prevention. Prof. zur Hausen is a very hard-working and extraordinarily modest man who admits that although he had heard rumors he was being mentioned as a Nobel candidate, he did not expect the award.

Academia: Your research efforts have been underway for many, many years now. You were already guessing long ago that cervical cancer might be caused by the human papilloma virus (HPV). How did you arrive at that hypothesis?

Harald zur Hausen: *Indeed, I started to speculate along those lines back in 1972, and at the same time I initiated experiments to prove the hypothesis. The reason was that we could negatively demonstrate that the herpes simplex virus type 2, suspected up to then to play a significant role, was not present as genetic material in cervical cancer cells. Thus, we looked for alternative candidates, and papillomaviruses seemed to be a good alternative worthy of further research.*

The results obtained by your team seemed to confirm that hypothesis. You were convinced that you were right, but not many scientists believed in your research back then. It seems that your results came up against great skepticism?

There was some skepticism concerning the acceptance of papillomaviruses as potential causes of cervical cancer, but of course it disappeared completely when in 1983 and 1984 we isolated HPV 16 and 18 DNA and demonstrated them in about 70% of cervical cancer biopsies.

Your team made several significant advances in the study of the human papilloma virus (HPV) back in the 1980s. Could you tell us about them? Which of them do you consider the most important?

The team made several significant advances after identifying a number of novel papillomavirus types. We were very much interested in the mechanism of how they contribute to cancer, and identified specific genes which need to be expressed in order to maintain the malignant growth of the cancer cells.

These days it is clear that this research has practical applications: a vaccine protecting against several types of HPV is now available. But in 1984, your efforts to convince pharmaceutical companies to work on developing such a vaccine did not end in success. Why do you think that was the case?

In 1984, 1985 and in the following two years, the polymerase chain reaction (PCR) method was devised – now a major method in molecular biology. While this method was under development, "inexperienced hands" data was produced which did not seem to support our assumption that HPV 16 and 18 play a significant role in cervical cancer. This discrepancy would only be resolved a couple of years later. The industry, however, was convinced by those data that it would not make sense to start development of a vaccine.

So what did make pharmaceutical companies ultimately take an interest in such a vaccine?

Initially the molecular data did not have support from epidemiological work. The interest reemerged again after epidemiological studies conclusively demonstrated that HPV seemed to play a role in cervical cancer.

Fortunately the HPV vaccine now exists, but so far it remains very expensive and therefore only available to some women. Nevertheless, the costs of treating the disease once it develops are much higher. Do you believe that vaccination should be made obligatory?

No, I do not think that vaccination should be obligatory. On the other hand, I feel that due to the enormous burden which cervical cancer and its precursor lesions present to most countries (cervical cancer causes the second-largest number of deaths in women worldwide), we should advise as much as we can that the vaccine should be taken by girls prior to the onset of sexual activity.

Can vaccination also be effective in men? Vaccinating both women and men would enable this sexually transmitted virus to be fought more effectively.

Personally, I would favor vaccination of boys as well, since this is the only way to interfere quickly with the spread of these infections. This could provide us with a chance to eradicate these viruses.

You have made many significant discoveries, and now you have even won the world's most well-known and prestigious scientific prize. But not all the types of the HPV virus have yet been identified. Will you continue to study these viruses, setting your sights on other types? What plans do you have for your own future?

As long as my health permits it, I will continue to look for the role of viruses in human cancers.

What advice might you be able to offer to up-and-coming young researchers who now are trying to find a place for themselves in the world of science?

Work hard, do not believe in dogma-like statements, and try to develop original ideas.

Thank you very much!

Interviewed by
Patrycja Dołowy
Warsaw–Heidelberg, July 2009