

„Robert-Koch-Award 2007“

Berlin, November 9th, 2007

Laudatio

Madame Professor Dr. Pascale Cossart

Dear Federal President,

Ladies and Gentlemen,

Chere Pascale,

“What is a microorganism that is innocuous for man or for a given animal species? It is a living being which does not possess the capacity to multiply in our body or in the body of the animal. But nothing proves that is the same microorganism should chance to come into contact with some other of the thousands of animal species in the creation, it might invade it and render it sick.” Louis Pasteur, the founder of the Parisian institute, which was named after him, formulated this sentence in 1885 during a controversy, which he worked out with Robert Koch. Koch and Pasteur were antipodes of the newly developing discipline of microbiology. They respected each other, but often they did not share the same opinion, for instance regarding the question on host specificity of pathogenic microbes. The question of host specific interactions is still important today.

An answer on this question was given by Pascale Cossart, whose work deals also with the problem of host specificity of microorganisms. Pascale Cossart made three important discoveries in order to solve the question and to unravel the mystery, Pasteur gave his generation in his time. As a model organism, she uses bacteria of the species *Listeria monocytogenes*. *Listeria* has the capacity to cross the intestinal barrier and to penetrate into the placenta of pregnant women. These microbes are able to cause severe infections of the fetus and to induce abortion. Pascale Cossart was able to show that *Listeria* specimen have the capacity to invade human cells. Inside human cells, they use human cell structures in order to move inside the cells. It was still questionable, however, why particular *Listeria* species invade human cells, while other variants cause infections in animals. Pascale Cossart was able to show that one particular surface structure of *Listeria monocytogenes* is able to bind a specific protein of human cells. This procedure is comparable to the process, if a key finds his lock. *Listeria monocytogenes*, for instance, is able to recognize a human protein. Surface structures of other host organisms, for example of mice, cannot be recognized by *L. monocytogenes* molecules. The reason is that the host protein differs between men and mice in one particular amino-acid. If this amino-acid is exchanged, the mouse lock protein can be recognized by a human key. Thus, Pascale Cossart was able to show that only one particular amino-acid is responsible for host specificity of *Listeria*.

These observations lead us to the third question: Why the factors, which are necessary to cause an infection, are produced during human body temperature of 37 °C. This problem was also solved by Pascale Cossart. She and her group were able to show that *Listeria monocytogenes* as also other microbes possess a “molecular thermometer”. This thermometer is able to measure the temperature of human body (37 °C) and turns on particular genes, which code for disease-causing factors. The work of Pascale Cossart directs our view on the inner part of infected cells and the interaction between invading microbes and host cells. Together with co-workers, she was able to establish a new

discipline termed “cellular microbiology”. The work of Pascale Cossart, however, has also practical implications, her results open the field for new strategies to combat infectious agents. The sentence composed by Louis Pasteur that “the microbes will have the last word”, is also true in our times. Sometimes, however, the human being is able to interfere and is also able to combat infectious agents successfully.

One word on the person Pascale Cossart. Pascale Cossart was born in Cambrai in Northern France, she studied Chemistry and Biology at the University of Lille, the place, where also Louis Pasteur has been working. In the eighties, she spent a certain time period at the Georgetown University in Washington. After one year living in Laos, Pascale Cossart came to the Institut Pasteur in 1976, where she is still working as a brilliant successor of Louis Pasteur. Pascale Cossart received numerous prizes and awards, she is a member of different academies of France and outside France also of the German Academy of Sciences Leopoldina. In 1998 she became member of the “Légion d’honneur”. Altogether, she is an exciting, overlooking colleague and a good friend. Pascale Cossart will receive the “Robert-Koch-Award” for her breakthrough publications in the field of “cellular microbiology”. Congratulations.

Félicitations!