231117-Courvalin-Laudatio-Robert Koch Foundation Gold Medal

On the occasion of the presentation of the Robert Koch Foundation Lifetime Achievement Award Gold Medal to Dr. Patrice Courvalin

Dear Distinguished Members of the Robert Koch Foundation,
Dear Distinguished Guests,
Dear Ladies and Gentlemen,
Dear Patrice Courvalin,

Today, I have the pleasure of presenting the laudatio for the Robert Koch Lifetime Achievement Award – Gold Medal – to Dr. Patrice Courvalin, Professor Emeritus at the Pasteur Institute in Paris (and my former PhD supervisor) -- for his pioneering work on antibiotic resistance in bacteria.

Patrice Courvalin has devoted his life to the molecular understanding of resistance to a variety of antibiotics in bacteria, focusing on bacterial pathogens that cause disease in humans. Among his and his team's greatest contributions to this field are the pioneering discovery and characterization of antibiotic resistance plasmids in Gram-positive bacterial pathogens, as well as the comprehensive analysis of resistance mechanisms that modify various sites on aminoglycoside antibiotics, activities that compromised the main bactericidal therapy of the time for enterococcal infections, namely the synergy between a beta-lactam and an aminoglycoside antibiotic. With the rapid proliferation of aminoglycoside antibiotic resistance in the late 1970s, vancomycin emerged as the leading treatment of the day. Perhaps Patrice's most important work has been the discovery of vancomycin-resistant enterococci, followed by a truly elegant description of the complex mechanism of this resistance and the genetics of the elements that express it. He and his team also developed new methods and genetic tools for the detection of antibiotic resistance, and were able to show how a wide variety of pathogenic bacteria can exchange genetic material with each other to confer antibiotic resistance. They showed how resistance spreads very quickly in this way, and how bacteria can even adopt resistance genes from antibiotic producers in order to protect themselves. Patrice also reported the first direct transfer of DNA from bacteria to mammalian cells. He and his wife Catherine developed bacterial vectors that have been used in many laboratories around the world as tools for the delivery and expression of large genomic DNA constructs, both *in vitro* and *in vivo* in animal models. All these findings have been and are of great practical importance for the development and use of antibiotics. Overall, research carried out in Patrice's laboratory brought new concepts in the field of antibiotic resistance, providing a solid foundation for the rational design of new antibiotics that are capable of evading clinically-relevant resistance mechanisms. Patrice's reputation in this field made him a much sought-after consultant to the pharmaceutical industry—However, his advice most often suggested stopping the development of a new molecule because of the emergence of resistance mechanisms that his laboratory had detected.

Patrice Courvalin began his career with a residency at the Pasteur Hospital in the early 1970s, where he was already interested in microbiology and followed the outcome of microbiological samples taken from his patients in the laboratory of Professor Yves A. Chabbert, who had recruited him at the end of his residency. With his background as an M.D., he quickly understood the value of biomolecular approaches with the application of

molecular biology techniques to the field of medical bacteriology, in particular the study of the mechanisms of bacterial resistance to antibiotics, and took up the subject in the laboratory of Professor François Jacob, which was next door. In the mid-1970s, Patrice was one of the first young researchers to go abroad and worked in the laboratories of Prof. Julian Davies and Prof. Bernard Weisblum at the University of Madison in Wisconsin, USA. He returned to France after 3 years (with his wife Catherine and his first son!). Back at the Pasteur Institute, he continued his scientific exchanges with a number of American scientists, including a collaboration and sabbatical at the Department of Microbiology of the University of California in San Diego.

With more than 45 years as a researcher and professor at the Pasteur Institute, first as Head of Laboratory and then as Head of the Antibacterial Agents Unit and Director of the National Reference Center for Resistance to Antibiotics – among other responsibilities held at the Pasteur Institute – Patrice Courvalin has received numerous distinctions, including multiple scientific awards and honorary degrees. He is a member of several scientific societies in both Europe and the United States, has served on the Editorial Boards of many international scientific journals and has been a member of major national and international boards and steering committees. He has always been a strong advocate of close collaboration between scientists and public authorities, to emphasize the importance of providing evidence-based answers to important questions that affect public policy. Patrice has always placed his work on the mechanisms of antibiotic resistance in a more general social context. He has always campaigned for the prevention of the emergence of bacterial resistance through the rational use of antibiotics in human and veterinary medicine, and a ban on their use in animal feed supplements. It is a recurring theme in his media appearances and conferences. He has played the major role as "whistle-blower", a fight that has lost none of its importance...

Patrice is known for the exceptionally rigorous standards he applied to his own work and for the high demands and expectations he placed on the research carried out by members of his laboratory. Patrice has always been a passionate researcher and manager, putting considerable energy into his work. He is a scientist with great intuition capable of spotting the “right moves” and seizing them. He is known for his strong temperament and personality, a genuine person who is not very “political”, and who is very easy to get along with. He cannot stand lazy people or fools, but is capable of great empathy with others.

Patrice had great respect for Prof. Yves A. Chabbert, his predecessor at Pasteur, and showed attachment and loyalty to the scientists who trained him at the start of his career as well as to the fellow students and scientists he met in laboratories in the US, who also went on to become leading scientists. He is also known for his love of arts and antique objects (an old typewriter sat in his office for many years) and, as a true Frenchman, gastronomy, aided by his wife Catherine's excellent cooking.

Patrice Courvalin is a remarkable physician/scientist with a deep understanding of bacterial genetics as well as biochemistry, which has given him the breadth of vision to identify what has become a leading global healthcare challenge, as well as the depth of vision to make discoveries with singular impact that have enabled the field as a whole to make significant progress. Throughout his career, he has combined fundamental and translational research with medical impact. He succeeded in attracting top senior researchers to his laboratory,

contributing to the development of his vision in the field of antibiotic resistance. Patrice has been an important source of inspiration for the careers of many scientists and clinicians who were trained in his laboratory. He has contributed to the training of more than 40 doctoral students, all of whom have gone on to find post-doctoral positions or have been recruited, sometimes even before completing their thesis. Patrice had an understanding of what medical research is, both fundamentally and inspired by the problems encountered in clinical practice. This was founded on an ongoing dialogue with clinicians and clinical microbiologists to better understand the clinically-relevant problems to which research could provide solutions. Hardly a year went by without a physician or hospital microbiologist completing a Masters or PhD in Patrice's laboratory. He has contributed to the training of many French clinical microbiologists of his generation and ours. Many of his former students now hold positions of responsibility in many countries, as well as in French hospitals, and -- one-- has been awarded the Nobel Prize in Chemistry.

Patrice Courvalin has published 9 books and more than 500 scientific articles with over 35,000 citations. Among Patrice's most remarkable achievements is his collection of books entitled "L'Antibiogramme", in which he established the principles of interpretative reading of the antibiogram, based on the results of his team's research, which has trained generations of microbiologists, first in the French-speaking countries of the South, then throughout the world.

Patrice has always been a strong advocate of science education and the importance of knowledge transfer and collaboration to promote innovation. His retirement from his laboratory did not mark the end of the invaluable contributions he has made in the important area of antibiotic-resistant infections. Patrice has recognized the growing and urgent need to enhance the skills of bacteriologists alongside technology. As we have seen with the recent pandemics, most of the major health problems of this century will be microbe-related. There is still an urgent need to find ways to understand and manage the rapid evolution of micro-organisms and to find new intelligent solutions for dealing with pathogens.

Communication and teaching through courses and conferences have always been at the heart of Patrice's activity. His dearest wish for his "legacy" is to organise a top-class international course for the best students and to make it permanent. Patrice and his wife Catherine now dedicate their lives to inspiring the next generation of scientists to continue the fight against the continuing spread of antibiotic resistance, and to giving them the tools to do so. Patrice has observed that most pharmaceutical companies have abandoned the search for new antimicrobials in favour of drugs for other diseases with higher profit margins. This shift has resulted in huge amounts of unpublished knowledge and experience that could be lost to humanity. To harness the wisdom and benefits of this experience, Patrice brought together his many friends in the field, from both industry and academia, and created an intensive 10-day program called the Interdisciplinary Course on Antibiotics and Resistance (ICARe), now in its 7th edition. This truly remarkable course is held every year on the Fondation Mérieux site, on the shores of Lake Annecy (see icarecourse.org.) It brings together 40 internationally-recognized scientists and physicians and 40 students from around the world for an in-residence exchange of information. This effort has no major sponsor, and every year Patrice and Catherine work tirelessly to find sources of support

around the world for this endeavour - which is truly ironic given the global importance of the issue. Characteristically, the course is delivered with the utmost rigor, and the students complete the program with an immense sense of appreciation and accomplishment. In fact, Patrice's standards are so uncompromising that, because many international students (and a few faculty!) seem to lack knowledge of the proper way to slice and eat French cheese, he introduced a lunchtime lecture on the cheeses of Haute-Savoie and how to cut and eat them properly!

Cher Patrice, cher „Monsieur Le Professeur", it is a great honour for me to take part in the presentation of this well-deserved award and to pay tribute to your remarkable career as a scientist, manager, teacher and my former advisor. We wish you and your family all the best for the future, and continued success in your work as a scientist and as a teacher.

Emmanuelle Charpentier, November 17th 2023

Sources:
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