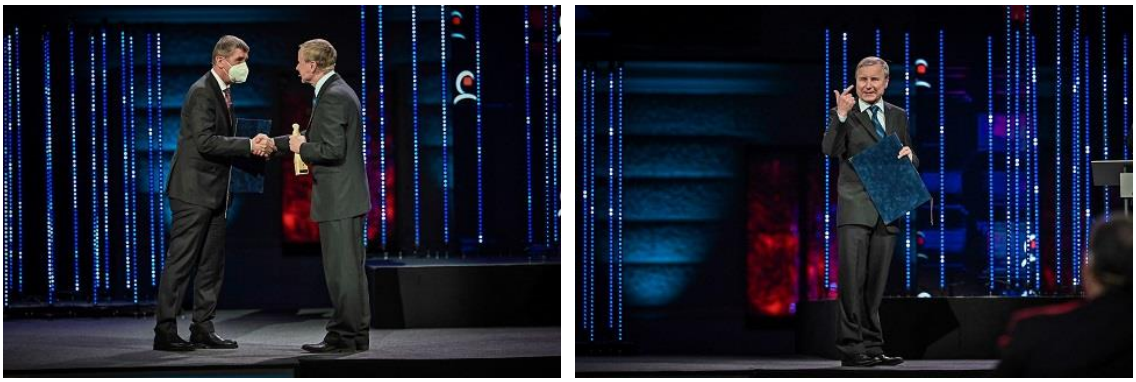
Rarely does great joy come in science. "Česká hlava" national award goes to immunologist Václav Hořejší

The government national award "Česká hlava" (Czech Mind) for this year goes to molecular immunologist Václav Hořejší. At a gala evening on Sunday 29 November 2020, the winner received this highest scientific honour from PM Andrej Babiš, who is also the chairman of the government Research, Development and Innovation Council. Along with the national award, the Council also awarded two honourable mentions for significant scientific contribution to the battle against the COVID-19 pandemic. The awards ceremony, broadcast by Czech Television in keeping with tradition, took place under strict hygienic conditions in the historic hall of the National Museum in Prague.



Prime Minister Andrej Babiš hands the highest scientific prize, the government national award, to Professor Václav Hořejší. Photo: Office of the Government

In his speech before handing over the government national award, PM Andrej Babiš highlighted the arduous role of research during a pandemic, helping as it does the sick to become well just like medicine and respiratory and other devices. He praised the work of Czech researchers at laboratories and development sites: *"In this unfortunate time we appreciate scientists more than ever and we understand how necessary support for research is. I thank all the experts for not letting up in their efforts to acquire new knowledge and use it for the good of our people's lives.“*

The PM further emphasised that the government gives more money to research every year, with 2019 seeing the highest ever amount of nearly CZK 112 billion. *"We have state-of-the-art scientific workplaces. The results of our research are better and better and you can hear about us abroad,"* added Andrej Babiš.

Award for scientific contribution to addressing the pandemic
"This year is special. It has logically been marked by the coronavirus pandemic, which has found a response in the world of scientific research. This is why the Council has decided to award another two scientific prizes as part of the 'Česká hlava' competition. We all know that if something can triumph over the virus, it is science," stated Council First Vice-Chairman Petr Dvořák on the modified structure of the awards at a press conference preceding the gala evening on Friday 27 November at Straka Academy.

As part of the 19th annual Česká hlava awards, **the Research, Development and Innovation Council awarded two honorary awards**, specifically:

– to the team of scientists at the Institute of Organic Chemistry and Biochemistry of the ASCR for their article published in the top journal Nature Communications; the published study paved the way for development of effective substances that could become a new generation of antiviral compounds
– the team of scientists of the Czech Institute of Informatics, Robotics and Cybernetics at CTU in Prague for creating the product "protective half-mask CIIRC RP95-3D".

Government national award
"Since its first years, the 'Česká hlava' [Czech Head] award has somewhat outgrown its appellation – in the eyes of scientists it is an international head, a global head. Václav Hořejší is without a doubt a world-class scientist. He is the successor of the famous immunological school, at this moment our most important immunologist, having attained enormous international renown. He is one of the few authors whose work inspires the greatest number of foreign researchers. He has discovered things that are extremely important for health, instruments by which one can examine various subtypes of white blood cells, which are discoveries important for treating a number of serious illnesses. The 'Česká hlava' will be in the best of hands," stated Petr Dvořák on the selection of this year's winner.

The Česká hlava national award is awarded once a year by the government of the Czech Republic at the proposal of the Research, Development and Innovation Council. The prize has been being awarded for extraordinary lifelong findings in research and development since 2005. The national government award also entails a **financial prize of CZK 1 million**.

"In science it is necessary to get used to the fact that most things don't tend to work. You have a hypothesis, but the experiments don't confirm it – and that's rather frustrating. But when even something minor does come out and it's the way you imagined it, that's a great joy," was how Professor Hořejší summarised his research experience.

The fresh holder of the national award also mentioned that his main workplace, the Institute of Molecular Genetics of the Academy of Sciences, has produced two previous holders of the government national award as well.

Prof. RNDr. Václav Hořejší, CSc.
Václav Hořejší is an outstanding scientific figure. He is in the top of his field as one of the most cited Czech scientists, the best known and most reputable Czech researcher on molecular immunology abroad. The places he has worked include Harvard University and in 2003–2011 he was a member of the Learned Society of the Czech Republic. Professor Hořejší is a head researcher at the Institute of Molecular Genetics of the ASCR and a professor of immunology at the Charles University Faculty of Science.

In the first decade of his scientific career, he developed new affinity models for the isolation and characterisation of the biologically significant proteins lectins. He and his team have long been dedicated to identifying and biochemically characterising the surface molecules of human white blood cells. His most significant scientific findings include his role in clarifying the composition and function of "membrane microdomains". The results of Václav Hořejší's research significantly contribute to the understanding of the mechanisms of how the immune system functions at a molecular level.

The team of the ASCR Institute of Organic Chemistry and Biochemistry
The team of Evžen Bouřa deals with the study of virus replication in human cells. It particularly uses the method of protein crystallography, wherein a protein crystal is "grown", and using the dispersion of light it is determined what that protein looks like in 3D. This information is then used in cooperation with the team of Radim Nencka to develop new molecules with the aim of obtaining antiviral drugs.

Journal article: IOCB ASCR: KRAFCIKOVA, P., SILHAN, J., NENCKA, R. & BOURA, E. 2020. Structural analysis of the SARS-CoV-2 methyltransferase complex involved in RNA cap creation bound to sinefungin. Nature Communications, 11. doi: 10.1038/s41467-020-17495-9
It is a work of an exploratory nature from the Czech workplace published in a top global journal. The work opens the door to development of next-generation virostatics, which have the potential to become "broad-spectrum" virostatics, and it aroused considerable interest from leading pharmaceutical companies.

The team of the Czech Institute of Informatics, Robotics and Cybernetics at CTU in Prague
The development and subsequent production of the protective half-mask CIIRC RP95-3D is a comprehensive project for realising an initial research idea right through to successful mass production. This is unparalleled in a Czech context. It is an utterly unique example of technological transfer from academia to industrial manufacture in an extremely short time.

In record time of one week, a protective half-mask providing the highest level of protection (FFP3) was produced in Vít Dočkal's group at the Czech Institute of Informatics, Robotics and Cybernetics at CTU in Prague. The researchers managed to develop, certify and also start manufacturing the mask so as to help protect doctors at hospitals and emergency workers as soon as possible. It is produced using 3D printing and thanks to a free licence it has spread to the whole world – the innovation is being utilised by 100+ institutions from 30 countries.

Source: RD&I Council press release | 1 December 2020