Akiko Iwasaki: “There needs to be more investment into basic science research if we are to be better prepared for the next pandemics”

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Akiko Iwasaki received her Ph.D. from the University of Toronto (Canada) in 1998. She joined Yale University (USA) as a faculty in 2000, and currently is an Investigator of the HHMI and Waldemar Von Zedtwitz Professor of Department of Immunobiology, and of Department of Molecular Cellular and Developmental Biology. Akiko Iwasaki's research focuses on the mechanisms of immune defense against viruses at the mucosal surfaces. Her laboratory works on a wide variety of topics, from **mucosal immunology to viruses**. She is the future president of the American Association of Immunologists. She also occasionally writes columns for The New York Times and is a **Twitter**celebrity. Together with some other scientists, she helped create a plan to stop Covid-19. She has also spoken out about the barrier's women face in the field of biology. Dr. Akiko Iwasaki held the seminar " Immune responses to SARS-CoV-2" at the CNIC, invited by Dr. Andrés Hidalgo.

- ***How worried should we be about this new Covid-19 strains that has appeared all over the world?***

There are now variants of concern that have higher transmission capability, evasion from antibodies and innate immune resistance mechanisms. To stop the spread of these variants, vaccines have to be given to as many people as possible, as soon as possible. We must also double down on mask wearing and physical distancing measures.

- ***In this sense, is it normal that so many variants have appeared in this space of time??***

It is a bit surprising that all these variants of concern and new variants of interest are arising in various parts of the world at the same time. This timing might reflect the duration needed to select for such variants amongst the population, particularly within immunocompromised patients who carry the virus for an extended time period.

- ***What reinfection means for a pandemic? It seems like that this is now a bigger problem than what when the first cases appeared***

Reinfection cases are rising as well. This may be because immunity acquired from the original infection is waning, and/or the rise of the variants that evade existing immunity. In addition, there are simply more people being exposed and reexposed to the virus around the world. Whether the reinfections are resulting in more or less severe disease, and what determines this outcome, is a key issue that still needs to be determined.

- ***Your work analyzes people with long-term covid who can't shake symptoms like fatigue and brain fog. Could you give us any clue as to why these symptoms persist and if there is a definitive profile?***

I think there are three possible ways in which long covid can happen. One is that the long term symptoms are caused by persisting viral infection that lingers. Second, is that these symptoms are caused by viral remnants that are persistent – not infectious virus but viral RNA and/or protein. Third, long covid is caused by autoimmune responses against self antigens. These are not mutually exclusive. Some long haulers have one while others all. It is important to understand which of these things are happening in which patient so we can provide appropriate therapy.

- ***One of your works during the pandemic was to show that the amount of virus in***

the saliva can predict how severe the disease will be. How does it work?

In collaboration with **Dr. Aaron Ring's laboratory at Yale**, we found that saliva viral load much better predicts disease severity and outcome than nasopharyngeal viral load. We suspect this is because saliva pools virus from organs such as the lower respiratory tract, where the virus can cause much more damage than the upper respiratory tract (detected by the nasopharyngeal swab). Viruses in the lower respiratory tract can be propelled upwards through the airway mucociliary escalator, and end up in the oral cavity.

- ***Autoimmune diseases are often more common in females than in males, but females perform better in Covid19. Can you comment based on your last findings on auto-Ab?***

We found many autoantibodies in the patients suffering from acute COVID disease. These antibodies are capable of driving worse disease, because some of them attack the very immune molecules and immune cells that are fighting the virus infection. In long covid, we are now looking to see if autoantibodies are found and if so, what they target. Autoimmune diseases are generally more frequent in women than men. Given that long haulers are dominated by women of younger age than the severe acute COVID (men of older age), we suspect that long haulers might have distinct set of autoantibodies that contribute to their symptoms.

- ***How science should prepare for the next pandemics. What have we learned from this one?***

The great triumph of vaccines against COVID did not come about in a vacuum. It is enabled by decades of basic science research. There needs to be more investment into basic science research if we are to be better prepared for the next pandemics.

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