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TrendsTalk

Ger Rijkers: Persistence of Memory in Times of COVID-19



In a review paper published 20 years ago, Rolf Zinkernagel asked the question: Why do we need immunological memory [1]? His argument was that if you and your immune system survived a given infection once, then why wouldn't you survive it a second time? You wouldn't need a better response for that. And of course, if you did not survive the first infection, having developed memory would be irrelevant.

Twenty years ago I didn't agree with him, but maybe now I do for the following reasons. We are currently witnessing a pandemic spread of a novel coronavirus, SARS-CoV-2, for which no one, neither old or young, has any form of immunological memory. Everyone thus depends on the strength of the primary immune response, either humoral and/or cellular, we don't know yet, for survival.

The data thus far indicate that the younger (including the youngest), when infected have milder symptoms and survive. The older ones, starting at 40, are hospitalized, may require intensive care, and can die from the consequences of COVID-19. Apparently, their immune systems are too weak to eradicate this novel virus in time. Would their immune systems be clogged with (for this infection) useless memory cells, hindering a fast and adequate primary immune response? Young, naïve immune systems learn faster to combat this virus, just like young children are better at learning a foreign language because their brains are not yet congested with vague memories of other languages.

From an evolutionary perspective, it makes sense that the youngest of a population have a better chance to survive exposure to a new virus. The current pandemic will offer the possibility to investigate the underlying immunological mechanisms, an understanding of which could contribute to better vaccines for now and later.

Many immunologists have used the 'Persistence of Memory' painting of Salvador Dali (1931) as a backdrop in talks and presentations on immunological memory. In a later version, but with the same theme, Dali made 'The Disintegration of the Persistence of Memory' (1954). In times of COVID-19, it would seem as if loss of memory is the key to survival.

References

1. Zinkernagel, R.M. (2000) What is missing in immunology to understand immunity? *Nat. Immunol.* 1, 181–185

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