

Covid, the Italian study: "It is fine particles and not pollution in general that affect infections and mortality"

Scientists Mauro Minelli and Antonella Mattei explained that the exposure to PM2.5 (commonly defined as fine dust) develops in the human body the ACE2 protein which "becomes a sort of lock for the virus and above all for its harmful action on 'body'". For this reason in other polluted areas of Italy, such as Taranto, but with low levels of PM2.5, the diffusion has not been as massive as in Lombardy and Veneto, where these levels are higher.

written by Francesco Casula | 9 GENNAIO 2021

The protein that protects the body from the damage of fine dust (precisely PM2.5) is the same that favors the harmful action of Sars Cov-2. This is what the study carried out by Mauro Minelli, immunologist and visitor professor of clinical immunology at the University of European Studies "J.Monnet", with Dr. Antonella Mattei, researcher of Medical Statistics at the Department of Life Sciences and Environment of the University of L'Aquila. The study, in fact, states that air pollution is not generally understood to be one of the causes of the greater incidence of infection on the world population, but the effects of people's exposure to PM2.5, that is a mix of fine particles produced by industries, vehicles and other sources, with particles with a diameter of less than or equal to 2.5 microns, i.e. thousandths of a millimeter. The work of Minelli and Mattei has deepened the associative link between the Covid-19 incidence rates and two environmental pollutants represented, in addition to PM2.5, also by nitrogen dioxide (NO2), correlated to two further factors: old age index and population density.

"We have seen - explained Minelli to ilfattoquotidiano.it - that exposure increases the incidence rate of Covid by 2.79 patients per 10 thousand people if the concentration of PM2.5 increases by one microgram per cubic meter of air, and 1.24 sick people per 10,000 people if the concentration of NO2 increases by one microgram per cubic meter of air".

The study, therefore, aims to highlight how the health emergency is closely connected to a specific "ecological dynamic". In fact, when our body is exposed to PM2.5 for a long time, it develops a protein called "ACE2" to defend itself from those dust, but that protein becomes a trap: "ACE2 - clarified Minelli - becomes a sort of lock for the virus and above all for its harmful action on the organism ". This thesis would explain the high rate of incidence, and then also of mortality from Covid-19, in the northern regions compared to those in the center-south. "To confirm this - adds the immunologist - it would be enough to analyze the data of Taranto and its province, notoriously one of the most polluted in Italy, but which for years has no longer recorded significant levels of PM2.5 as detected by the Puglia Arpa control units distributed in the Ionian territory. As of November 3, 2020, Taranto was the penultimate province of Puglia for Covid-19 incidence rates, followed only by the province of Lecce ". For Minelli, therefore, to speak in general of smog or pollution is incorrect or at least too generic and therefore misleading.

The study, published by the International Journal of Environmental Research and Public Health, states that "individuals permanently exposed to medium or high levels of PM2.5 develop, due to a high expression of ACE2, a sort of automatic protection against the pulmonary inflammation produced from PM2.5 for the deadly chemical composition of this mixture of micropollutants. This particularity, however, may not be entirely useful and advantageous in the event that, as happens with Covid-19, the virus responsible for the disease uses ACE2 as a cellular internalization receptor. Therefore, ACE2 is the 'lock' through which Covid 'deceives' the human cell, penetrates it, infects it and, consequently, triggers the entire pathological process that characterizes the clinical picture ".

To this it should be added that “the individual differences relating to the distribution and functionality of ACE2 could explain, at least in part, the different entity of the symptomatological pictures variously expressed by the affected subjects. In children, for example, it has been hypothesized that their lower vulnerability compared to the new coronavirus is due precisely to the fact that the ACE2 receptors may not be so developed, or have a different conformation than those of adults. And this would make the connection between the virus spike and the entry lock in the cells more difficult ”.

In short, the reason why Lombardy and Veneto are the most affected areas is due, according to the study, to the fact that those areas "are more massively and chronically exposed to high levels of PM2.5, which involves an increased expression of ACE2 in the lungs ”which causes“ the high rate of incidence and then also of mortality ”. And then, especially in Lombardy, the population density is very high, another factor examined in the study.

Finally, Minelli raised a question: “Between March and May, in Italy, as in most of the world, everything stopped. There was no vehicular traffic. Cars, ships, planes were all at a standstill. Industries have stopped. The emission rate of the various pollutants, obviously including PM2.5 and nitrogen dioxide, has collapsed as documented by the reports of the research program linked to the launch of the European Copernicus Sentinel-5P satellite. And at the very beginning of the summer we had a significant reduction in the number of Covid cases. Then, after the lockdown, we reopened everything and, consequently, the pollution levels started to rise again. So, was the second wave really just caused by the reopening of clubs, schools and other places? Or - concluded Minelli - the inability to block the new advance of the virus, which resists the colors of the areas and the generalized use of masks and containment measures, could be linked to the real impossibility of generating a significant reduction in pollution, equal to that obtained during the first lockdown? ”.



Sources: <https://www.ilfattoquotidiano.it/2021/01/09/covid-lo-studio-italiano-sono-le-polveri-sottili-e-non-linquinamento-in-generale-a-influire-su-contagi-e-mortalita/6059791/>