



Citation: L. Campanella, M. Anastasio (2020) A Possible Scientific Answer to Covid-19 Among Open Science, Big Data, Old and New Expertise and Knowledge: the Position Paper of Chemistry. *Substantia* 4(1) Suppl. 1: 890. doi: 10.13128/Substantia-890

Received: Mar 27, 2020

Revised: Mar 30, 2020

Just Accepted Online: Apr 01, 2020

Published: Apr 01, 2020

Copyright: © 2020 L. Campanella, M. Anastasio. This is an open access, peer-reviewed article published by Firenze University Press (<http://www.fupress.com/substantia>) and distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Editorial

A Possible Scientific Answer to Covid-19 Among Open Science, Big Data, Old and New Expertise and Knowledge: the Position Paper of Chemistry

Luigi Campanella*, Maurizio Anastasio

Department of Chemistry, Sapienza University, Piazzale Aldo Moro 5, 00185 Rome, Italy

*Corresponding author: luigi.campanella@uniroma1.it

"The single biggest threat to man's continued dominance is the virus"

This statement was made by Joshua Lederberg in 1958 in the occasion of his Nobel Lecture. This claim cannot be forgotten in this period while we are looking for a reason of hope and this hope, after ensuring adequate sanitary services and responsible behavior of citizens, can come only from Science.

Medical sciences represent undoubtedly the queen disciplines, but many other disciplines can play a very important role. At this particular moment the basic core of knowledge is provided by the group of biosciences such as medicine, virology, biology, biotechnology. It is fundamental to have an intradisciplinary group that speaks the same language at the start of any research activity. After the working group started it is absolutely necessary that the same group acquires interdisciplinary features because a scientific problem has to be regarded from different competences and cultures. This is the only approach to increase the likelihood of finding an acceptable and positive solution.

That said, it is clear that the solution must emerge from cultural and speculative differences. In other words, generally speaking, the successful team must be as heterogeneous as possible. Analyzing from a general point of view the various disciplines that participate in the study. Perhaps chemistry can guarantee a specific attitude in criticism, a *forma mentis*, with its epistemological characteristics that are highly dependent on conceptual, theoretical and experimental diversity. For these reasons, chemistry can support and act as a "glue" in the group of disciplines that have made up the fundamental historical group to combat Covid-19.

Chemists have the full right to be part of the group of researchers for these types of works. Somebody may think that such a heterogeneous group, could have difficulties in language and culture for the benefit of the work, but this interaction, between heterogeneous competences clearly fits into a holistic vision of the health problems, related to hygienic, environmental, alimentary, social conditions. Speaking of the coronavirus, it is probably the best way to face such integral approach if Chemistry is taken into consideration.

In fact Chemistry can contribute by looking at aspects and problems never considered before and which can only be highlighted through a sensitivity that is characteristic of this discipline.

This is the profound value and meaning of working in diversity. A fundamental issue is related to particulate matter. A sound scientific literature describes the role of particulate matter (PM) as an efficient carrier to transport and to diffuse a great lot of chemical and biological contaminants, including viruses.

Particulate matter plays a negative role if it shows binding capacity to retain bioparticles. The latter would remain in the air for hours or days in active and vital conditions. Waiting for better times when different styles of life will be adopted in order to improve environmental conditions, for their physical and chemical characteristics they can be considered co-indexes and co-markers of the possible spread of viruses.

This hypothesis could be easily checked by advanced instrumental analysis by taking samples of air in certain areas and analysing them for its chemical pollutants and virus content, or better still, investigating as per regarding possible chemical or physical bonds between the two components.

Other than viruses it does not seem easily understood why real regulations about PM consider only the weight and the size of the particulate without any scientific interest toward its nature, to correlate to hygiene and safety limits.

During several international congresses chemists have presented proposals focused on the determination of PM toxicity levels together with its weight; for instance immobilizing PM particles on specific collecting filters the abiological component could be able to give information about the toxicity level of the collected PM. Another point refers to the fact that starting from the way by which a virus is multiplied in hosting human cells a question comes up: why in some cases viruses cause the death of cells and therefore of organisms while in other cases none or modest damages are observed?

A possible answer may be a genetic or epigenetic difference between living beings as well as a difference of antiinflammatory and antioxidant patrimony that varies from person to person.

These patrimony differences can be determined through many chemical or biochemical methods. Another important aspect of chemistry concerns scientific data, their meaning, but above all how they are obtained and how they must be communicated.

Chemistry is a predominantly an inductive science, then the scientific method is synonymous with an experimental method.

For this reason, it is essential that communication and data sharing must proceed successfully, but this latter condition presupposes easy accessibility to magazines, journals and research results. This is why the chemical community has always defended "Open Science criteria".

Having examined, even if shortly, the set of almost unique and original characteristics of the chemical sciences, we can imply that chemistry is entitled to join and contribute with the other disciplines side by side, by making available its own techniques and significant contents, particularly in this dramatic moment.

The working group, for which we propose a a rational composition, has an absolute need to receive certain answers from chemistry through its two main features, that is analysis and synthesis. We have seen how chemistry, or better chemical sciences, can collaborate closely with those disciplines and subjects already mentioned above whose presence and activities in the group are absolutely necessary and we all agree on this.

But beyond the technical and scientific contributions that chemistry can provide, it is necessary to re-emphasize one of its unique characteristics that perhaps could act as a catalyst in the team's work: chemistry works positively if and only if it can cultivate, by working alone or in a team, the concept of diversity and scientific doubt.