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Editorial

Thoughts about the Chemistry of Natural Products

Plants and other living organisms have been used as sources of different products for long time. The understanding that the use of traditional medicine could lead to compounds for the treatment of many diseases opened an avenue for the investigation and discovery of new drugs from plants.

This approach generated a number of wonderful examples that can illustrate how plant-derived products became medicines.

Although, for a long time, most of the discovered drugs have had their origin on plants, more recently the isolation of new natural products from different organisms has opened opportunities in drug discovery. Frequently, natural products are not used as they occur in nature, but become the inspiration for the development of structurally modified new ones with more druggability.

The beginning of the natural product research in Brazil was characterized by a more traditional work in this field, and the phytochemical analysis was the main objective together with the investigation of medicinal plants. Describing new compounds and exploring their chemistry sometimes seemed to be enough. More recently, there has been an increase in the search for bioactive natural products but, perhaps, the understanding of their chemistry and the real meaning of their existence in living organisms have been missing.

The research on natural products, as usually occurs in some areas of science, has been under pressure from the funding agencies that expect the results of research to be transformed into products. Having that in mind, most of the projects in this area have their rational almost exclusively on the possibility of finding new drugs.

Certainly, this argument is convincing enough by itself. Nevertheless there are many other possibilities to work on natural products since they can be used for many other purposes, such as in agriculture, in cosmetics, also, as dyes, paints, inks, etc. In addition, natural products are involved in ecological processes that include different organisms. In two papers,[1,2] together with other co-authors, we have discussed the possibility of working on the frontier of chemistry and biology. We highlighted examples of the generation of chemical diversity by using genome mining, mutasynthesis, combinatorial biosynthesis, metagenomics and synthetic biology, while some aspects of microbial ecology were also discussed.

Ten years ago, Schreiber, a renowned chemist from the Harvard University, in his paper "Small molecules: the Missing Link in the Central Dogma"[3] stated "small molecules have critical roles at all levels of biological complexities and yet remain orphans of the central dogma. Chemical biologists, working with small molecules, expand our understanding of these central elements of life".

He also suggested four goals for people working in this area that, if reached, would transform the field:

(*i*) "illuminate the origins of life and create alternative life forms";

(*ii*) "complete the inventory of all naturally occurring small molecules";

(*iii*) "identify a small-molecule modulator for each individual function of all human proteins";

(*iv*) "create an effective bridge between basic and clinical research by systematically linking genetic variation in cells to the ability of small molecules to effect phenotypic change in cells".

Even though the search for new drugs from plants and other organisms is still exciting and attractive, chemistry is a central science and has played a key role in the explanation of biological and biochemical observations, opening a number of opportunities in the area.

In Brazil, we have developed expertise in the chemistry of natural products. Therefore, Brazilian researchers can develop good science in the area. However, it seems interesting to highlight that the projects should focus the wide sense that the area represents.

The Brazilian Chemical Society (SBQ)[4] has been publishing some journals[5] for several years. This means it already has the experience to offer authors good quality publications, such as the Journal of the Brazilian Chemical Society (JBCS).[6] Any article published in the JBCS has open access and can be read everywhere in the world through the internet. This is a key point for the development of the chemistry of natural product area: good journals and good papers, which means good science for the benefit of the country.

So, I would like to finish by inviting the natural product chemist community all over the world to publish good papers in the JBCS.[7]

Chemistry plays an important role and is pivotal to explain a number of interactions among many organisms. If you have a paper that fulfills these criteria, submit it.

A worldwide visibility will be given to your paper and do not forget that a good paper will be good no matter where it is published.

Paulo Cezar Vieira
JBCS Associate Editor

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