



Proteomics studies on Protozoan Parasite Biology

Diseases caused by parasitic protozoa affect millions of people in tropical and subtropical regions of the world. Many of them are considered as Neglected diseases because they affect mainly impoverished population that suffer with the lack of vaccines, proper field diagnosis tools and affordable non-toxic treatments. Currently, this scenario is more severe because the COVID-19 pandemic is impacting the most vulnerable people, worsening poverty and deepening inequality in the access to health services, diagnosis and treatment [1–3]. Despite the cut in funding, ongoing researches around the world are continuously increasing our knowledge on protozoan parasites' biology and host-parasite interactions reinforcing the foundations for developing new control strategies. During the last decades we have seen enormous growth in knowledge about the organization and expression of the genome of protozoan parasites. Despite this, the information that genomic and transcriptomic approaches can provide on proteoforms diversity and functional expression of proteins and their activities is very limited. As proteins regulate the myriad of mechanisms that govern such processes, proteomics studies can contribute for the understanding of the biology of protozoan parasites and the diseases they cause.

How proteomics can contribute to deeper our understanding of parasites' biology? Can the large-scale study of proteins of these organisms bring new insights on control approaches? Until now, diverse proteomics technologies have shed light on parasites' protein inventories, differential abundance of protein during life cycle stages, and mechanisms of infection, survival and virulence. Additionally, proteomics methods have provided insights on drug resistance mechanisms, host-parasite interactions and new therapeutic approaches for the diseases associated with protozoan parasites [4–8].

However, many questions on the biology of these organisms require deeper quantitative studies. For example, as most of the protozoan parasites develop their life cycles between invertebrate insects and mammalian hosts, further unbiased quantitative proteomics studies are required to understand the extraordinary capability of these organisms to differentiate, adapt and survive in such very distinct and challenger host environments. In turn, comprehension of functional adaptation of protozoan parasites requires large-scale studies of protein-protein interactions, protein cellular localization, and post-translational modifications (PTMs), which are still barely understood. Additionally, characterizing the mechanisms of drug resistance and describing novel potential drug targets are also urgently needed for controlling diseases caused by protozoan parasites.

In this scenario, we are pleased to present the special issue on "Proteomics studies on Protozoan Parasite Biology". This thematic issue brings together different new information about protozoan parasites biology, as well as distinct aspects of the interaction with their hosts. The

papers included in this collection bring original data on specific interactomes of *Leishmania braziliensis* and *Plasmodium berghei*; exosomal content of *L. infantum*; modulation of host immune responses by the secretome of *L. braziliensis*; studies on the spliceosome, and S-nitrosylation in *Trypanosoma cruzi* as well as a quantitative study of histone PTMs in this parasite. Readers will also find quantitative studies of the phosphoproteome of *T. brucei* and *L. donovani*, as well as a review on PTMs in kinetoplastids. In addition, this collection includes a study analyzing the serum peptide signatures associated with different stages of *Toxoplasma gondii* infection; a description of a new methodology using tagged synthetic peptides for identifying receptors involved in *Plasmodium* invasion, and a bioinformatics approach for identifying disordered domains in trypanosomatids. Finally, the readers will find reviews on *Plasmodium vivax* omics and *E. histolytica* proteomics.

We thank all the authors that contributed their studies for this thematic issue and we invite you to read the papers included in this collection; these represent advances and promises for the future of protozoan parasites proteomics.

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