

New Trends in Biosciences II

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1. Introduction

Biosciences encompass an area of international scientific research that focuses on the mechanisms underpinning and regulating biological processes in organisms across all branches of life. The regulation and evaluation of biosciences is increasing, and this is probably a healthy tendency—at least to a certain extent. Via these scientific fields, there is much to learn about the social, scientific, and economic functioning of contemporary bioscience from the case. It is also why we thought it essential to seek the views of the scientists through hosting a consultation on biosciences.

The Special Issue “New Trends in Biosciences II” aimed to invite worldwide investigators as well clinicians confident in applied biosciences research to submit their most interesting overviews, reviews, hypothesis, proof-of-concept, case report, and original articles providing novel insights regarding multidisciplinary research in the field of biomedicine and biological engineering applications.

Potential topics included, but were not limited to, translational research, bioengineering types, clinical engineering, system modeling, biosignal processing, stem cells, bioscaffolds, biomedical devices, health informatics, bioinformatics, biotechnology, biomechanics, computational mechanobiology, microbiota, and the role of oral health and disease on contributing to general health and systemic conditions. The main focus was on novel developments and applications in themes relevant to biomedicine.

2. New Trends in Biosciences II

The objective of this Special Issue was to group the most recent and relevant research in relation to new trends in Biosciences into a single document. Subsequently, the possibility of publishing a book with the contributions of all authors will be assessed.

Despite COVID-19 crises and lockdowns in most countries, there were still 12 papers submitted to this Special Issue, and 7 of them were accepted (4 original articles, 1 review, and 1 case report), which display high-quality research and a strong interest in the field of Biosciences. In the following paragraphs, a summary of these papers with their most relevant contributions is presented.

In the first paper included in this Issue, the authors investigated the characteristic of a post hoc re-analysis of their initial study that suggests that consumption of the adaptogenic, caffeine-containing product which preferentially benefited individuals with an initial low trait of mental and physical energy (TME/TPE) and a high trait of mental and physical fatigue (TMF/TPF) status when compared to caffeine alone. These findings also support their previous study, suggesting that adaptogens may promote mental and physical performance benefits while modulating potentially negatively associated responses to caffeine [1].

In the second paper, Lubamba et al. attempted to explore dual-tox screens, to probe the dissemination of nutrients involving one-way transport with upstream compound



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dosing, midstream cascading flows, and downstream cessation. The multi-well device, unidirectional flow, and six-sigma analysis presented in the manuscript demonstrate the rapid detection of direct compound toxicity and the trailing detection of cell-byproduct influencers across cell culture platforms [2].

Other authors presented an original article on the formation of the inclusion compound γ -CD-PG and its effect on the radical scavenging activity of the guest, phloroglucinol. The structural characterization of this host–guest system was conducted both in solution and in the solid state. The radical scavenging activity was studied in different media. The media followed a sequence that simulates the gastro-intestinal tract because the inclusion compound is aimed at a future application in food fortification. The results show that the inclusion compound is readily formed and that it lowers the radical scavenging action of phloroglucinol, hinting at a sustained release effect [3].

The study of Barbagini et al. presents a proof-of-concept prototype of a user-friendly, portable, and electrically isolated device for vPWV measurement. The entire hardware of the device is embedded in a small, handy box thanks to a single board computer, the Raspberry Pi, wirelessly connected to a PC, where a graphic interface allows it to interact with the device. The performance of the RPi-based device was tested on four healthy subjects subjected to PLR, and it was compared with measurements performed by the original laboratory equipment (PC-based system). So, in the Special Issue, the first compact and battery-powered device for vPWV measurement was presented and validated, demonstrating good reliability and good sensitivity to simulated fluid challenges [4].

Another group aimed to highlight the link between anterior cruciate ligament's (ACL) molecular structure and its aggregate mechanical behavior. At one extreme, such a link uses molecular dynamic simulation to characterize the fibril structure properties as a function of crosslink degradation. At the other extreme, the link uses a multilevel hyper-elastoplastic fibril-reinforced model to simultaneously investigate how changes in the fibril structure are manifested at the ligament level. They hypothesized that the integrity of the fibril plays a remarkable role in the expression of ACL macro-damage. This approach can help to elucidate the basic building block of the ACL, which is crucial for determining a unique mechanical property with a high level of realism. Thus, defining a more meaningful mechanism towards disease affects the integrity of the ACL. Finally, the techniques used in this study are easily adaptable to the study of additional ligamentous structures and other soft tissues [5].

In an interesting review, the authors introduce the theoretical foundations of ergonomics as applied to regional anesthesia and discuss how this influences the conduct of peripheral nerve block (PNB) techniques. They also highlight that improving PNB practice has the potential advantages of improving patient safety, especially in deep regional blocks. Additionally, a summary table has been made to outline the newly updated concepts in PNB-related ergonomics [6].

The last paper of this Special Issue aimed to describe a case of guttate psoriasis presenting an imbalance of growth factor production from blood cells (CGF) before the onset of pathology, detected by an ELISA. Our data could form a new hypothesis on the role of platelets in psoriasis. Taken together, these results show the new aspects of this dermatological pathology, opening new possibilities both as a method of study, using a platelet-rich plasma preparation as CGF, and the involvement of platelets and their growth factors in their development and maintenance. Our data, obtained during the case study, should be validated in the future and could address new clinical trials to better characterize the pattern expression of growth factors to identify new therapeutic targets [7].

3. Conclusions

The seven manuscripts presented in this Special Issue contribute to improving our understanding of the new trends in biosciences. For the reader's convenience, the collected contributions were summarized in three main groups: (I) research; (II) review; and (III) others. Each article has made an original contribution to the development of practical

bioscience that can be replicated by researchers around the world. Being aware of the multitude of technological solutions and possible applications, we wish to further promote this type of research.

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