Editorial

New Trends in Biosciences

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1. Introduction

The regulation and evaluation of biosciences are increasing, and this is probably a healthy tendency—at least to a certain extent [1–4]. Via this scientific field, 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 consultation on the biosciences [5–9].

The Special Issue "New Trends in Biosciences" was aimed to invite worldwide investigators as well clinicians confident in applied biosciences research to submit their most interesting overviews, reviews, hypotheses, proof-of-concept, case reports, 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 in contributing to general health and systemic conditions. The main focus was on novel developments and applications in biomedical relevant themes.

2. New Trends in Biosciences

The objective of this Special Issue is 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 25 papers submitted to this Special Issue, and 18 of them were accepted, which proves the quality of the research and the 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 characteristics of anaerobic microorganisms in stool samples obtained from 20 patients with sporadic colorectal adenomas/polyp (SCA/P) and 20 subjects without evidence of proliferative lesions at colonoscopy. Their findings suggest that, compared to control stool samples, a different intestinal microbiota is present in SCA/P stool samples, which may create a micro-environment predisposing for the development of proliferative phenomena. As a consequence, gut microbiota manipulation could be a future target for personalized treatments [10].

The second paper presented a methodology to investigate the effect of early intervention with fecal microbiota transplantation (FMT) combining *Clostridium butyricum* (CB) and *Saccharomyces boulardii* (SB) on growth performance, diarrhea, and intestinal barrier function in piglets. In summary, early intervention with FMT combining CB and SB improved

the growth performance, intestinal barrier function, fecal short-chain fatty acids (SCFAs) concentration, and fecal *Lactobacillus* and *Bifidobacterium* of piglets [11].

In dentistry, silver nanoparticles (AgNPs) have progressively earned great interest as antimicrobial drugs and are widely used in several biomedical fields. Recent progress in the analysis of complex bacterial communities has demonstrated the richness of the oral microbiota and the presence of numerous previously unexplained strains. Several studies have been dedicated to the investigation of antimicrobial peptides (AMPs) [12].

Enamel defects (EDs) are qualitative and/or quantitative disturbances of the dental surface. To date, the responsiveness to remineralizing treatments has been studied ex vivo, on dental sections from extracted teeth. In a proof-of-concept study, Contaldo et al. [13] aims to establish if in vivo reflectance confocal laser scanning microscopy is able to visualize the changes in the enamel architecture on living teeth before, during, and after remineralizing treatments by casein phosphopeptide-amorphous calcium phosphate (CPP-ACP).

Other authors try to quantify the relative bioavailability of microencapsulated vitamins A and E in nursery pigs and compare the effects of vitamin forms and vitamin levels on the plasma vitamin content and growth performance of weaned piglets. Results show that microencapsulation can improve the bioavailability of vitamins, and supplementation with high levels of vitamins was able to improve the growth performance of the piglets [14].

In an interesting review, the authors introduce publicly available databases for drug repositioning and summarize the approaches taken for drug repositioning. They also highlight and compare their characteristics and challenges, which should be addressed for the future realization of drug repositioning [15].

Moccia et al. review the mechanisms underlying inflammation-related Temporomandibular disorders (TMD), highlighting the potential role of polyphenols as a promising approach to develop innovative management of temporomandibular diseases [16].

Another group aimed to find whether it is possible that beta-catenin, associated with the development of serious systemic diseases, as well as the neoplastic process, plays a role in the development of pseudoexfoliation syndrome (PEX). It might be possible for PEX, due to it being easily recognizable, to be the first indicator of serious kidney or cardiac diseases, as well as cancer metastases [17].

Because glycogen storage disease (GSD) represents a group of twenty-three types of metabolic disorders which damage the capacity of the body to store glucose classified based on the enzyme deficiency involved and affected patients could present some oro-facial alterations, Romano et al. conducted a systematic review of the literature among different search engines using PICOS criteria, to catalog and characterize oral manifestations in these patients [18].

In an additional original study, the authors propose a technique that can be used by individuals with lower limb amputations for the management of their residual limb's volume variations, especially when using prosthetic socks. The focus of this study was to develop a low-complexity system such that it would be inexpensive, easy to install inside the user's prosthetic socket, less prone to failures, and easy to use from the end-user's perspective. These characteristics would increase the impact that this technology would have on the affected population by enhancing the adaptability of the developed system [19].

Double filtration plasmapheresis (DFPP) is an emerging semi-selective apheretic method for treating immuno-mediated neurological diseases. In this Special Issue, De Masi et al. report the first case of steroid-refractory relapsed multiple sclerosis (MS) on Fingolimod (FTY), treated effectively by this technique, in a 37-year-old woman. Their findings were: First, the steroid-refractory relapsed MS on FTY, however serious, can be treated with DFPP; second, given the good clinical improvement due to the DFPP-induced neuroinflammatory components removal, this clinical condition can be associated with a Lucchinetti pattern II of demyelination [20].

Since early 2020, COVID-19, a consequence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has rapidly affected millions of people worldwide. The SARS-CoV-2 infection in children appears to be an unusual event. Due to the promising effects

of mesenchymal stem cells (MSCs) in the treatment of various diseases, Balzanelli et al. hypothesis aimed to focus on the auxiliary role of MSCs to reduce inflammatory processes of acute respiratory infections caused by the 2019 novel coronavirus (COVID-19) [21].

Coronary computed tomography angiography (CCTA) is a first-line non-invasive imaging modality for the detection of coronary atherosclerosis. Computational modeling with lipidomics analysis can be used for the prediction of coronary atherosclerotic plaque progression. In the study proposed by Sakellarios et al., a multi-parametric predictive model, including traditional risk factors, plasma lipids, 3D imaging parameters, and computational data, demonstrated 88% accuracy to predict site-specific plaque progression, outperforming current computational models [22].

Currently, little published research exists evaluating the stability of commercial vitamin A products during storage. Therefore, in a further study, Yang et al. aimed to determine the storage stability of five commercial sources of vitamin A in premix, and provide a guideline for product formulation and application [23].

Alternative treatment strategies are necessary to reduce the severity of glaucoma, a group of eye conditions that progressively damage the optic nerve and impair vision. The aim of Bergandi et al. review was to gain insight into potentially exploitable molecular mechanisms to slow down the death of retinal ganglion cells (RGCs), a fundamental element in the pathophysiology of all forms of glaucoma, and to stimulate adult optic nerve repair. For this purpose, they focus analysis on both visible and far-red to near-infrared light photobiomodulation (PBM) as phototherapeutic agents, which were recently proposed in RGCs, and on the nerve lamina region neural progenitor cell (ONLR-NPC) niche [24].

It is well-known that tooth brushing might be associated with the development of oral soft tissue lesions. There is currently a continuing increase in the demand for new safety and performing materials in daily homecare oral hygiene, including soft and extra-soft toothbrush bristles that tend to be safer. An original and featured study presented in the Special Issue, aimed to compare the efficacy of plaque control and the potential effects on gingival health of two different toothbrush bristle models. From the comparison between data and the literature studies, the authors can state that the material and shape of the bristles of the toothbrush affect the home practice of oral hygiene. The proposed thermoplastic elastomer (TPE) bristles reduce the presence of plaque formation and gingival bleeding, oral soft tissue injuries acquired during homecare oral hygiene [25].

Apples are the most popular fruits grown in Polish orchards. In order to obtain the best quality fruit, it is necessary to improve plantation maintenance, fruit harvesting, and processing. Given that many fruits are exposed to external factors, including forces that adversely affect their structure—causing them to crack, bruise, or crush—it is necessary to provide conditions that do not adversely affect their quality. Therefore, the aim of Szyjewicz et al. article was to develop a simplified model of an apple that could be tested under different loads using the finite element method [26].

The last paper of this special issue aimed to compare the 3D cranial implants reconstructed from computed tomography (CT) images using the open-source MITK software with commercial 3-matic software for ten decompressive craniectomy patients. The results also showed that the open-source MITK software is comparable with the commercial software for designing patient-specific implants [27].

3. Conclusions

The 18 manuscripts presented in this Special Issue can contribute to improving our understanding of the New Trends in Biosciences. For the reader's convenience, the collected contributions were summarized into 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 want to promote this type of research.

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