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Editorial

This special issue was published on occasion of the 10th anniversary of the *International Biotechnology Innovation Days* (*IBID*) 2018, which took place at the Senftenberg campus of the Brandenburg University of Technology (BTU) Cottbus – Senftenberg, from the 23rd to the 25th of May 2018. The *IBID* was launched in 2003 under the name *Senftenberger Innovationsforum*. The open access conference attracted about 200 international delegates from research institutions, clinics, biotech and pharma industry.

This year's conference was organized by the Institute of Biotechnology of the Brandenburg University of Technology Cottbus-Senftenberg, the BioResponse e.V. and the Cluster HealthCapital Berlin-Brandenburg, with support of the Technical University of Applied Sciences Wildau, the Helmholtz-Zentrum Geesthacht and the Brandenburg Medical School Theodor Fontane.

The *IBID* 2018 event was dedicated to the latest developments in biomedical and translational research, medical bioinformatics and bioanalytics. A vast panorama of topics has been discussed, ranging from molecular biomarkers in translational medicine to tissue engineering and cell therapies. One session and one day of data science workshops was devoted to medical bioinformatics since big-data clinical studies employing electronic healthcare records (EHR) provide additional insight into biomedical research. They may even provide evidence for guiding therapy [1]. The data science workshops were also pre-meetings for the second edition of the *Why R? 2018* conference (Wroclaw, Poland, 2nd–5th of July 2018).

Many of the *IBID* 2018 topics are covered in this special issue that includes one concept study, seven primary studies, and two reviews.

Rosanski et al. [2] describe the knockout of proteolytic key regulators in malignant peripheral nerve sheath tumor cells with a special regard to the multifunctional proteasome activator PA28γ. The authors made use of the clustered regulatory interspaced short palindromic repeats (CRISPR)/Cas9 system; this method of genome editing has been one of the fastest growing areas in biotechnology for decades [3]. Application of microbeads and microscopic technologies suitable for point-of-care diagnostics play an increasing role in modern biotechnological techniques. Jurischka et al. [4] present a universal detection method for biomolecules using tyramide signal amplification (TSA) on the surface of protein-coated microbeads. In detail, they focus on the E6:E7 region of the high-risk human papillomavirus 16 (HPV-16). This method is potentially useful for the development of novel multiplex microbead assays. Another innovative analytical method was discussed by the work of Kagel et al. [5]. The authors review the application of photoacids as non-invasive control for biochemical reactions. Photoacids are molecules that become acid upon absorption of light and might bear great potential for future applications in biotechnology and biochemistry.

In the field of cell and tissue engineering, three-dimensional cell growth, protein scaffolds as well as sample storage become emerging challenges. The question of how the differentiation potential of spheroids is influenced by a co-culture of human chondrogenic microtissue with osteoblast-like cells or fibroblasts was investigated by Lutter et al. [6]. Functional biomaterials are important for tissue engineering. In principle, structural proteins and signal molecules can be used for the targeted control of cell migration. The work of Berger et al. [7] describes an immersion process for the production of protein gradients on collagen type I membranes to control cell migration. To use mesenchymal stromal cells from cryopreserved umbilical cord tissue for therapeutic purposes, it must be ensured that properties of the sample material are not significantly altered during storage. The work of Hansen

et al. [8] deals with the question of how such samples must be treated to apply them therapeutically at a later date.

A quite significant aspect of the *IBID* 2018 in terms of healthcare was all the research activity surrounding the Brandenburg Health Campus (Gesundheitscampus Brandenburg). By 2015, a statewide network of universities, non-university research institutions, hospitals, medical institutions and industry partners has been established aiming to upgrade practical training and education of health professionals and to focus on research in the fields of digital health, personalized medicine and the physiology as well as the social consequences of age-related cell and organ dysfunctions. The philosophy of the 'Gesundheitscampus' is to develop individualized strategies in medicine and to ensure access to health in regions sparsely populated, overaged, and threatened by a declining infrastructure. Rural and dwindling regions such as Brandenburg require and are desperately seeking disruptive technologies like patient-sided diagnostics, wearables and implants that can be used for diagnostics and guiding therapy.

The review of Pfeil et al. [9] deals with how the current developments of smartphone-based mobile microscopes can be used for precise medicine. They carve out the technical requirements of these devices, their diagnostic promises as well as their limitations.

Ruhe et al.'s [10] work investigates how peripheral blood mononuclear cells (PBMCs) can be cryopreserved for subsequent analysis of DNA double strand breaks (DSBs) by phosphorylated histone protein H2AX (γHAX). This examination is particularly important for chemotherapy and radiation therapy. Cryopreservation makes it possible to transfer samples over long distances to specialized centers.

Another important goal of the Brandenburg Health Campus is the tight integration of basic scientific and evidence-based clinical research also, but not only, in the field of immunology. The work of Dammermann et al. [11] describes a whole blood-based cytokine-release test for the determination of cellular immunity in hepatitis E resolver patients. Using the specific interferon gamma release assay (IGRA), the authors were able to determine the T-cell response to HEV antigens in resolved hepatitis E patients (RHE). Wachtel et al. [12] ask if high n-3 PUFA could be disadvantageous in the context of immune therapy due to an immune suppressive effect that has been described for these fatty acids in the past, or whether they could also enhance the effect of immune checkpoint inhibition.

We look back on a breathtaking successful anniversary conference full of lively discussions and interesting presentations and we are pleased to present a broad spectrum of topics in this special issue. We strongly believe that *IBID*'s open-mindedness at the cutting edge of biotech keeps the benefit of our joint efforts as ready as the perspective of diagnosing and guiding therapy of patients while bridging miles, disciplines, and preconceptions.

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