B-CULTURE

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B-CULTURE was founded by a team from 3B's Research Group of University of Minho. Focused on materials engineering, regenerative medicine and stem cells, the team have been working for the development of technologies for application in the healthcare sector. The founders represent more than 30 years of experience in the field, counting in their CV's a high number of awards, publications and a large amount of collected funding from national and international sources to support the high-quality scientific research. Currently, R. Canadas is the CEO, J. Oliveira the CSO and R. Reis the Chairman. A. Marques is a Scientific Advisor of the startup.

Technology: B-CULTURE offers the BIOreACT system (figure 1) to the Pharma, Cosmetic and Medical Implants Industries as a solution for relevant preclinical product screening. Typically, drugs take 12 years to be licensed and the costs reach $1.5 billion[1]. In average, 87% of the molecules getting to the clinical trials are false positives due to low preclinical testing accuracy[2]. Notably, improving 10% in their prediction can save up $100 million/molecule[3]. In this regard, B-CULTURE technology enables a human-like 4D environment able to control and regulate two different but connected human-like tissues (e.g. bone-cartilage, dermis-epidermis, blood-brain sides,), granting no ethical concerns unlike animal models and realistic screening unlike the in vitro alternatives. Our first products-to-market are the skin and osteochondral models. Overall, we provide a solution for monitored realistic screening of medical products.

Market: The Pharmaceutical and Cosmetics market together sum $1,667 billion[4,5]. In 2017, the market of cell culture systems was evaluated in $9,792 million[6]. Importantly, the 3D cell culture niche presents an impressive prediction of 20.3% growth by 2022[7]. B-CULTURE's patents cover the USA and EU regions and our entry region is the Iberian Peninsula in Europe, representing 1.73% of the global market[8]. Microfluidics and organs-on-chip devices are the main alternatives to our system. However, these approaches lack robustness for medical products testing, since organoids and spheroids are used and present limited reproducibility due to self-assembling. On the other hand, bioreactors can also be direct competitors, but they still lack specific features to reproduce interfaces able to mimic the native tissue barriers relevant for implants effectiveness assessment and drugs diffusion, as the bone-cartilage interface and the skin.

Commercialization Strategy: Initially, B-CULTURE will sell the system directly to customers, who need models in disposable chambers for drug testing as a 'razor and blade' model. Later, a multi-channel strategy will be approached. Additionally, the chambers are also designed to be used as a standalone component. Beyond sales, training, support and customized microtissues will also be provided. BIOreACT passed the TRL5 (technology demonstration in laboratory) and is now being tested at the Academic Hospital level. Besides developing brain *in vitro* models for Alzheimer disease, free chambers have been provided to different collaborators for the development of cancer, skin, liver, cartilage and bone models. Simultaneously, industrial partnerships for the fabrication of the system were identified. CE and UL certifications will be targeted in 2019 and 2020 together with the first sales. New versions, incorporating real-time monitoring and new robotic designs, will then be released. Our market assessment was performed approaching either researchers and companies through surveys and personal meetings. Overall, the potential costumers' feedback asked for assay kits containing packaged ready-to-use platforms and protocols. Furthermore, free training and collaborative work projects can entice the consumers. A relevant number of 17.6% of the surveyed population is planning to start using 3D cell culture. Our financial goals are listed below:

- Within the first year an 85.7% contribution margin on platforms and 87.5% in disposable dual-chambers;
- Achieve the breakeven point two years after first sales;
- Achieve the payback three years after first sales;
- Decrease the bargain power of suppliers (outsourcing and distribution).
- Sell the company to a large Pharmaceutical or CRO player, or to a Cultureware Manufacturer into 6 years.

Figures:

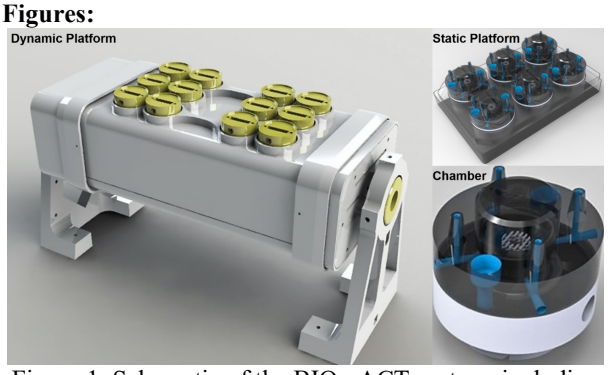

Figure 1. Schematic of the BIOreACT system, including the static and dynamic versions

References:

[1] K. Thomas. *Guard.* **2016**.
[2] K. Stock, et al. *Sci. Rep.* **2016**, *6*, 28951.
[3] *Food and Drug Administration*. **2004**.
[4] *P. Commerce*. **2018**.
[5] *Reuters Editorial News*. **2018**.
[6] *Research And Markets*. **2017**.
[7] *PRNewswire*. **2017**.
[8] *Health Market Research.* **2017**.