

PROPOSITIONS

A tissue engineered model of skeletal muscle

Creating next-generation tools to study muscle biology and neuromuscular disorders

1. In the age of advanced tissue engineering, the differences between *in vivo* and *in vitro* models will blur, challenging our concept of organisms in a lab setting. (*This thesis*)
2. Tissue engineered organs-on-chips have the potential to replace most *in vivo* animal testing in the future. (*This thesis*)
3. The immature characteristics of hiPSC-derived muscle cells are unrelated to cellular reprogramming, considering the similar developmental signature that primary adult myoblasts manifest when cultivated *in vitro*. (*This thesis*)
4. Organ-on-chip technologies are indispensable for the development of true personalized medicine. (*This thesis*)
5. Bio-centers, in the form of muscle-farms, could produce and monitor thousands of 3D-TESMs simultaneously with advanced technologies. Testing of new drugs and therapies can thereby be expedited, enhancing treatment efficiency for neuromuscular disorders. (*This thesis*)
6. While the potential of hiPSC-derived myogenic progenitors in 3D muscle models is vast, the road to clinical translation is paved with challenges such as maturation, vascularization, and innervation. (*Adapted from Osaki et al., 2018*)
7. The most promising prospective application of body-on-a-chip (as well as organ-specific) systems is to bridge the large gap between preclinical predictions based on animal studies and the actual outcomes of clinical trials. (*Adapted from Esch et al., 2015*)
8. As the technology interfacing with organs-on-chip will advance, the amount of data and information produced will increase dramatically. In this context, the use of AI will become necessary.
9. Creating an organ-on-chip with high-quality cells and advanced technology is not enough. The ultimate goal of the field should be to ensure that these *in vitro* organs perform their functions, whether it's motion, secretion, stimulation, or even processing of information.
10. Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution (*Albert Einstein*).
11. The greatest deception men suffer is from their own opinions (*Leonardo da Vinci*).