

## Cultivated Meat – Addressing Climate Change and Biodiversity Loss

Paul Bartels<sup>1</sup>, Elize Venter<sup>1</sup>, Duval Van Zijl<sup>2</sup>

<sup>1</sup>WildBio Co, Pretoria, South Africa. <sup>2</sup>LaunchLab, University of Stellenbosch, Stellenbosch, South Africa

### Abstract

Conventional factory farming is responsible for land use change, excessive fresh water use, greenhouse gas emissions, pollution and the decline of biodiversity. Industrial fishing is stripping the oceans of marine natural resources. Getting people to change their eating behaviour away from excessive meat and marine life consumption is more than challenging. Stem cell derived muscle and fat has the potential to give people what they want to eat, namely meat from terrestrial animals and marine life, while at the same time making a significant contribution to the conservation of the environment and biodiversity. Small muscle and fat biopsies are taken under local anaesthetic from live animals and the cells processed using cell-culture techniques. Processing involves the separation of cells into pre-adipocytes, fibroblasts and myoblasts. Each cell type is grown separately, first in incubators, and later in bioreactors. Research projects currently include cell characterization, micro-carrier cell adherence, cell maturation, growth media formulations, nutritional analysis, bioreactor design & operation, and hybrid food product formulations. In South Africa, biopsies have been collected from ten antelope, livestock and chicken species and the cells grown in incubators and bench-top bioreactors. Mogale Meat has gone further by designing and taking into operation, two demonstration clean-room 12 meter containers (Zebra One & Zebra Two) with the future purpose of establishing cultivated meat mini-Plants in urban and rural communities. Mini-Plants will be able to grow nutritious animal protein where it is needed most and do so by drastically decreasing supply chain issues and food insecurity. Cultivated chicken meat has been served to consumers in Singapore by the Good Meat Co, the only country to date that has regulated for the production, sale and consumption of cultivated meat. Investments into cultivated meat start-up companies totalled \$1.2B in 2021. Cultivated meat requires universities and research institutions to undertake convergent multi-disciplinary research involving multiple disciplines such as biochemistry, chemistry, pharmacology, tissue engineering, biotechnology, cell culture, food science, meat science, computer modelling, bioreactor and bioprocess design. The industry requires further research in order to produce cell-mass suitable for producing cultivated meat in SA. Cultivated meat is destined to contribute significantly to the conservation of biodiversity, wildlife and the environment.