**BACKGROUND**

**HISTORY:** Asilomar Conference on Recombinant DNA 1975

The discovery and development of recombinant deoxyribonucleic acid (DNA) technology allowed for the transfer of DNA between different species. In response to the concerns that were raised and later informal consultation with colleagues, Paul Berg presented his concerns at an informal meeting of the scientific community, leading to the Asilomar Conference in 1975.

**The next generation of the SC2.0 Project**

In 2010, Craig Venter’s team synthesized the entire Mycoplasma genitalium genome and implanted it into another species of bacterium, Mycoplasma capricolum, resulting in the first living organism with a fully synthetic genome. This project, supported by the Synthetic Genomes Institute (SGI), aimed to advance the field of synthetic biology by demonstrating the feasibility of creating fully synthetic life from scratch.

**ETHICAL ISSUES IN SYNTHETIC BIOLOGY**

The public is both curious and cautious about synthetic biology. Curiosity for the science is cutting edge and a fascinating blend of engineering, tinkering and biology. Curious to the unknowns that come with any new, emerging technology. Most of the concerns in synthetic biology are related to the positive and negative aspects of the technology, which can lead to potential harms.

**S2C PROJECT BACKGROUND**

In 2018, Craig Venter’s team synthesized the entire Mycoplasma genitalium genome and implanted it into another species of bacterium, Mycoplasma capricolum, resulting in the first living organism with a fully synthetic genome. This project, supported by the Synthetic Genomes Institute (SGI), aimed to advance the field of synthetic biology by demonstrating the feasibility of creating fully synthetic life from scratch.

**NEED FOR A GOVERNING DOCUMENT**

The scope of the SC2.0 Project is unprecedented. SC2.0 is a massive, collaborative project that involves diverse scientists from multiple academic and commercial institutions across the globe. The project also includes a group of motivated synthetic biology scientists from Los Angeles, USA, working at the LA Biohackers lab (http://www.biohackers.cc). With scientists from different fields working together on a single project, it is essential that everyone is well informed and comfortable with regard to the ethics and policy issues related to this project. Collaborators are from many different countries where the local and national laws differ greatly. As such, we felt that this project would benefit from a unified document addressing the major ethical and policy issues related to the project and our collaborative approach to these issues. These guidelines were finalized after extensive discussion among SC2.0 members and are summarized below.

**ETHICS AND GOVERNANCE AGREEMENT**

The SC2.0 Project is for the benefit of society:

1. **Peaceful purposes.** As scientists and humans, we wish our work on the SC2.0 project to contribute to the benefit of society and not add to its harm.
2. **Transparency and Public Communication.** While the Brookes laboratory is primarily responsible for the maintenance of the SC2.0 Project website, all collaborators will regularly contribute additional information and data to be added to the site. The Brooksbank lab is also primarily responsible for public outreach and encourages and supports outreach to other SC2.0 locations.
3. **Safety.** SC2.0 is designed to be safe to handle within the lab and utilisable to survive outside the laboratory setting. All strains contain a number of nonoptimum mutations that make them dependent on laboratory conditions. Neither SC2.0 nor its intermediates will be intentionally released into the environment. Furthermore, we are exploring the possibility of adding additional expression repressors, further reducing the likelihood that this organism, or any of its intermediates, would be viable outside of the laboratory.
4. **Data Distribution.** To reduce the chance of distributing materials to individuals with malicious intent, members of the SC2.0 Project will take precautionary steps to verify the identity of individuals requesting materials or data prior to shipping any project materials.
5. **Compliance:** SC2.0 is designed to be shipped within the lab and utilizable to survive outside the laboratory setting. All strains contain a number of nonoptimum mutations that make them dependent on laboratory conditions. Neither SC2.0 nor its intermediates will be intentionally released into the environment. Furthermore, we are exploring the possibility of adding additional expression repressors, further reducing the likelihood that this organism, or any of its intermediates, would be viable outside of the laboratory.

**REFERENCES**


**CONCLUSIONS**

1. This is the first document of its kind (that we are aware of) in this field. It addresses ethical issues that arise in synthetic biology in the context of a large, international collaborative synthetic biology project. It provides a set of recommendations and guidelines to govern the SC2.0 project to which all collaborators agree to adhere to.

2. As the field grows and evolves, project-specific statements such as this may help catalyze additional collective action in synthetic biology. They also affirm individual commitment to community goals, such as those articulated by the participants in SC2.0.

**ACKNOWLEDGEMENTS**

We would like to thank_fit_for helpful discussions.

For more information, please visit: http://syntheticyeast.org/s2c2/