Presentation Abstracts and Background Materials

SCIENTIFIC ADVISORY COMMITTEE ON ALTERNATIVE TOXICOLOGICAL METHODS

Session 2b: Moving Away from Animal-based Antibodies
Wednesday, September 2, 2020

➢ Introduction

Presenter: **Dr. Warren Casey, NIEHS/NICEATM**

Affinity reagents such as antibodies are indispensable components of modern biomedical research programs. Studies have shown that antibodies derived from animal sources are one of the largest contributors to irreproducibility in biomedical research. The use of invalid antibodies can cost laboratories thousands of dollars a year and "trigger junk-data avalanches through the literature" and which prompted a 2015 Nature commentary from 111 academic and industry scientists that called for an international shift to the use of recombinant antibodies (rAbs) to improve the reproducibility and reliability of biomedical research. In May 2020, the European Commissions' Joint Research Centre (JRC) recommended an end to using animals to produce antibodies in favor of highly reproducible, sequence-defined rAbs and made three key findings:

1. Nonanimal-derived antibodies are mature reagents generated by a proven technology.
2. Nonanimal-derived antibodies offer significant additional scientific benefits.
3. Nonanimal-derived antibodies should be promoted.

Building on the JRC findings, NICEATM organized a meeting in collaboration with PETA International Science Consortium, Ltd. (PETA-ISC) in Dec 2019 to discuss the use of nonanimal-derived antibodies in biomedical research and biotechnology with experts from academia, biotechnology, government, and animal protection organizations. The meeting resulted in a publication discussing the current needs for antibodies in research, barriers to the use of animal-free reagents, and next steps to increase the use of animal-free recombinant antibodies in the United States. Participants considered near-term activities and approaches that could have the greatest impact, with emphasis on antibodies produced for basic biomedical research which represent the largest antibody market. The workshop was followed by several publicly available webinars, including the 2020 ICCVAM Communities of Practice, that presented a review of the usefulness and limitations of nonanimal-derived affinity reagents, their potential to replace animal-derived reagents, and strategies for increasing the use of rAbs. One major impediment to the use of recombinant antibodies (Abs) identified at the workshop is the cost of developing these reagents, as most rAbs need to be custom-made upon request. Therefore, an investment in the development and manufacture of rAbs will be necessary to enable pricing and availability consistent with existing animal-derived antibodies.

Background

- Blame it on the Antibodies
- Standardize Antibodies Used in Research
- A Genecentric Human Protein Atlas for Expression Profiles Based on Antibodies
- The Path to VICTORy – A Beginner's Guide to Success Using Commercial Research Antibodies
- EURL ECVAM Recommendation on Non-animal-derived Antibodies

- Increasing the Use of Animal-free Recombinant Antibodies
- ICCVAM 2020 Communities of Practice Webinar
- Webinar Series on Animal-free Recombinant Antibodies
- Change-makers Bring on Recombinant Antibodies

➢ Human-derived Recombinant Antibodies and COVID-19 Therapeutic Development

Presenter: **Dr. Sachdev Sidhu, University of Toronto**

Dr Sachdev Sidhu (Toronto Recombinant Antibody Centre) will describe his work at the Toronto Recombinant Antibody Centre, particularly related to developing non-animal antibodies against the coronavirus SARS-CoV-2.

Background

- Synthetic Antibodies with a Human Framework That Protect Mice from Lethal Sudan Ebolavirus Challenge
- Two Synthetic Antibodies that Recognize and Neutralize Distinct Proteolytic Forms of Ebola Virus Envelope Glycoprotein
- Synthetic Antibodies Neutralize SARS-CoV-2 Infection of Mammalian Cells