Cracking the Glycan Code

Nicole Kho Clay
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CURRENT RESEARCH

Boosting the plant immune system against disease

The use of natural products has been the single most successful strategy in the discovery of novel medicines. A startling 25% of our medical drugs today come from plants, including many anti-cancer agents, but hundreds of thousands of plant natural products have not yet been discovered. In addition, 95% of the human proteome and most of the secreted plant proteome are modified by similar glycans, including nearly all of the immune sensors. To improve human medicine, agriculture and smart materials, Dr. Nicole Clay, of Yale University, uses functional genomics, glycomics and metabolomics to build glycan-controlled immune sensors for greater disease resistance, and to engineer gene regulatory networks for the generation and capture of chemical innovation. In short, by taking into account the glycome and the metabolome and decoding their languages, Dr. Clay's research is not only making strides towards understanding the origins of many human diseases that are not directly encoded in the languages of DNA and proteins, such as allergies, Alzheimer's disease, asthma, autism, diabetes, Lou Gehrig's disease, multiple sclerosis, Parkinson's disease, and rheumatoid arthritis, but is also helping to create novel medicines to combat them.

As a young investigator, Dr. Clay has already been awarded for her rigorous science by being honored with the Elsevier Phytochemistry Young Investigator award in 2014. Perhaps most exciting about her innovative research in glycomics and metabolomics are Dr. Clay's efforts to enter fields of biology that are underexplored in a post-genomic era, and to tap an underutilized but proven source of chemical wealth. With the advent of plant "molecular pharming" (the production of...

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AFFILIATION

Yale University

EDUCATION

- Postdoctoral fellow in Dept of Molecular Biology, Massachusetts General Hospital,Dept of Genetics, Harvard Medical School,2005-2010
- Ph.D. in Molecular, Cellular & Developmental Biology 2005,Yale University
- B.S. in Biology 1996 , Massachusetts Institute of Technology

AWARDS

- Elsevier/Phytochemistry Young Investigator Award, 2014

RESEARCH AREAS

Technology, Chemistry

FUNDING REQUEST

Your contributions will support the continued research of Dr. Nicole Clay, of Yale University, as she studies the innate immune system and secondary metabolism of plants. Donations will support the necessary $350K required each year for both the functional glycomics work and the plant metabolomics research. In choosing to donate, you will play a role in developing broad-spectrum disease resistance in crop plants in addition to identifying novel plant natural products for human therapeutics, bioenergy and smart materials.