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# Samuel J. Danishetsky and the Synthesis of Globo-H Antigen

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# Samuel J. Danishefsky and the Synthesis of the Globo-H Antigen

Chelsey Jones
CHE-203-002

## Early life and Education

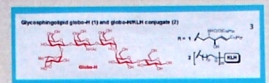
- Born on March 10, 1936 in Bayonne, New Jersey[5]
- Earned his B.S. from Yeshiva University in 1956
- Earned his Ph.D. in chemistry from Harvard University in 1962
- National Institutes of Health Postdoctoral Fellowship at Columbia University[6]

## Career

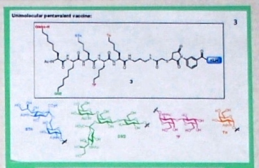
- Professor at the University of Pittsburgh until 1979
  - Earned the title of University Professor
- Professor at Yale University from 1979-1993
  - Named Sterling Professor
- Director of the Laboratory for Cancer Research at Sloan-Kettering Cancer Center from 1991-present
  - Became chair in 1993
- Professor at Columbia University from 1993-present[6]

## Contributions

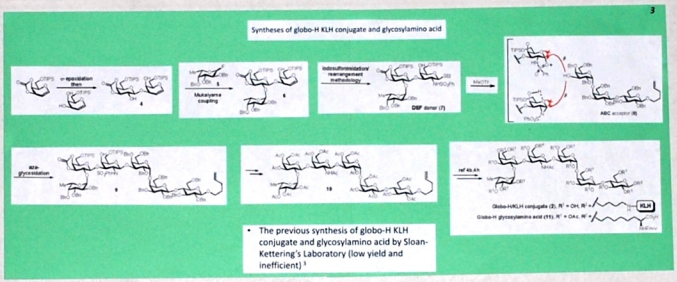
- Synthesis of anti-cancer vaccines
  - Carbohydrate antigens
    - GM2 glycosylamino acid (2005)
      - Prostate cancer vaccine[2]
    - Globo-H (2009)
      - Breast and prostate cancer vaccine[3]
  - Cause the immune system to create antibodies to attack cancer cells and keep cancer from spreading[1]
- Synthesis of Homogenous glycoprotein (2009)
  - Erythropoietin
    - Can be used in clinical treatment
    - Able to treat anemia that is related to renal failure and chemotherapy[4]



- The Glycosphingolipid globo-H was isolated first by Hakomori[3]
- The globo-H/KLH conjugate was synthesized in Sloan-Kettering's Laboratory[3]

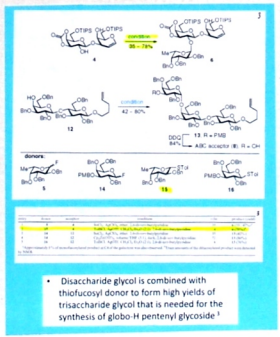


- The unimolecular pentavalent vaccine displays globo-H with other antigens and was synthesized in Sloan-Kettering's Laboratory[3]

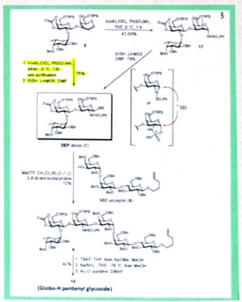


- The previous synthesis of globo-H KLH conjugate and glycosylamino acid by Sloan-Kettering's Laboratory (low yield and inefficient) [3]

## Synthesis of Globo-H Antigen



- Disaccharide glycol is combined with thiofucosyl donor to form high yields of trisaccharide glycol that is needed for the synthesis of globo-H pentenyl glycoside [3]



- The trisaccharide glycol needs to be converted to DEF donor and the most efficient method is highlighted. It produces high yields of DEF donor and does not require purification like the other method [3]

## Awards

- Wolf Prize in Chemistry
- American Chemical Society's Guenther Award
- Aldrich Award for Creative Work in Synthetic Organic Chemistry
- The New York City Mayor's Award for Science and Technology
- Bristol Myers Squibb Lifetime Achievement Award
- Benjamin Franklin Medal[6]

## Conclusion

Samuel J. Danishefsky has contributed an extensive amount of knowledge to the field of organic chemistry. He has worked with synthesizing carbohydrate antigens to develop anti-cancer vaccines and with synthesizing homogeneous glycoprotein to treat anemia. His most important work would be his work with the development of anti-cancer vaccines. Cancer is a common disease that many people suffer and die from. By synthesizing an anti-cancer vaccine, there could be a cure for cancer which could save many people's lives.

## References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- [5]Marquis Who's Who LLC. Samuel J. Danishefsky. http://www.lexisnexis.com.ezproxy.parkland.edu:2048/hottopics/lnacademic/? (accessed 9/14/10), part of *The Complete Marquis Who's Who Biographies*
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