(How HSV interferes with the normal functions of its cellular receptors)

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Dept of Biomedical and Translational Sciences
College of Science and Mathematics

Krummenacher lab at Rowan University

Current:
Gabriel Haila (Biochemistry)
Paige Richards (Biology)
Jessenia Roldan (Biology)
Nick Verratti (TBS)
Aaron Rack (TBS)

Graduated:
Kevin DAmico (CHOP) '16
Paul Rothlauf (Harvard) '17
Abe Hakim (Cooper Medical School at RU) '17
Rebecca Murray (teaching) '17

Ongoing lab projects:
Effects of HSV on the functions of its receptors (cellular, immunological).
Characterization of antiviral compounds.
Isolation of bacteriophages from honeybee microflora.

Rowan collaborators:
Chun Wu (Chemistry)
Subash Jonnalagadda (Chemistry)
Lana Vojvodic (Biology)

Rowan funding:
Rowan University SEED funding
College of Science and math start-up funds

External collaborators:
Gary Cohen and Roz Eisenberg (PENN)
Xiao Zhang and Bing-chun Zhao (Sun Yat-sen Univ., Guangzhou)
Jose-Antonio Lopez-Guerrero (Univ. of Madrid)

Roz Eisenberg's retirement

Professor of Microbiology
Laboratory Head, Laboratory of Microbiology
Department of Pathobiology School of Veterinary Medicine

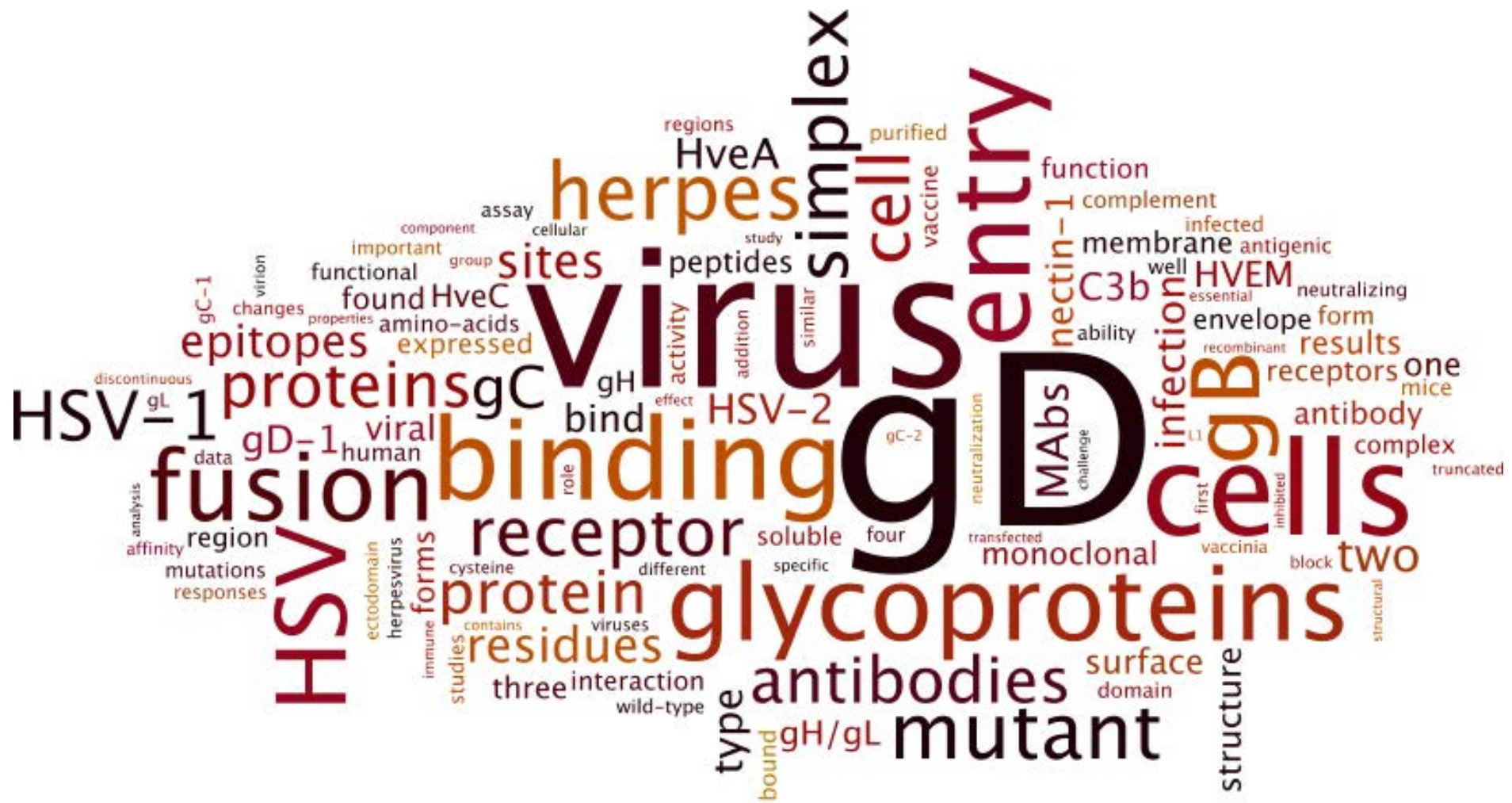
Fellow, American Academy of Microbiology.
Fellow, American Association for the Advancement of Science.

Lenore Rowe Williams Award, UPENN, 2006, for outstanding scientific contributions and leadership as well as mentorship of the next generation of aspiring women scientists.

194 peer reviewed articles
18 reviews or book chapters
(Cited 12415 times in 5119 articles)
>> 200 abstracts, posters
8 patents
Several NIH grants

Roz Eisenberg's CV

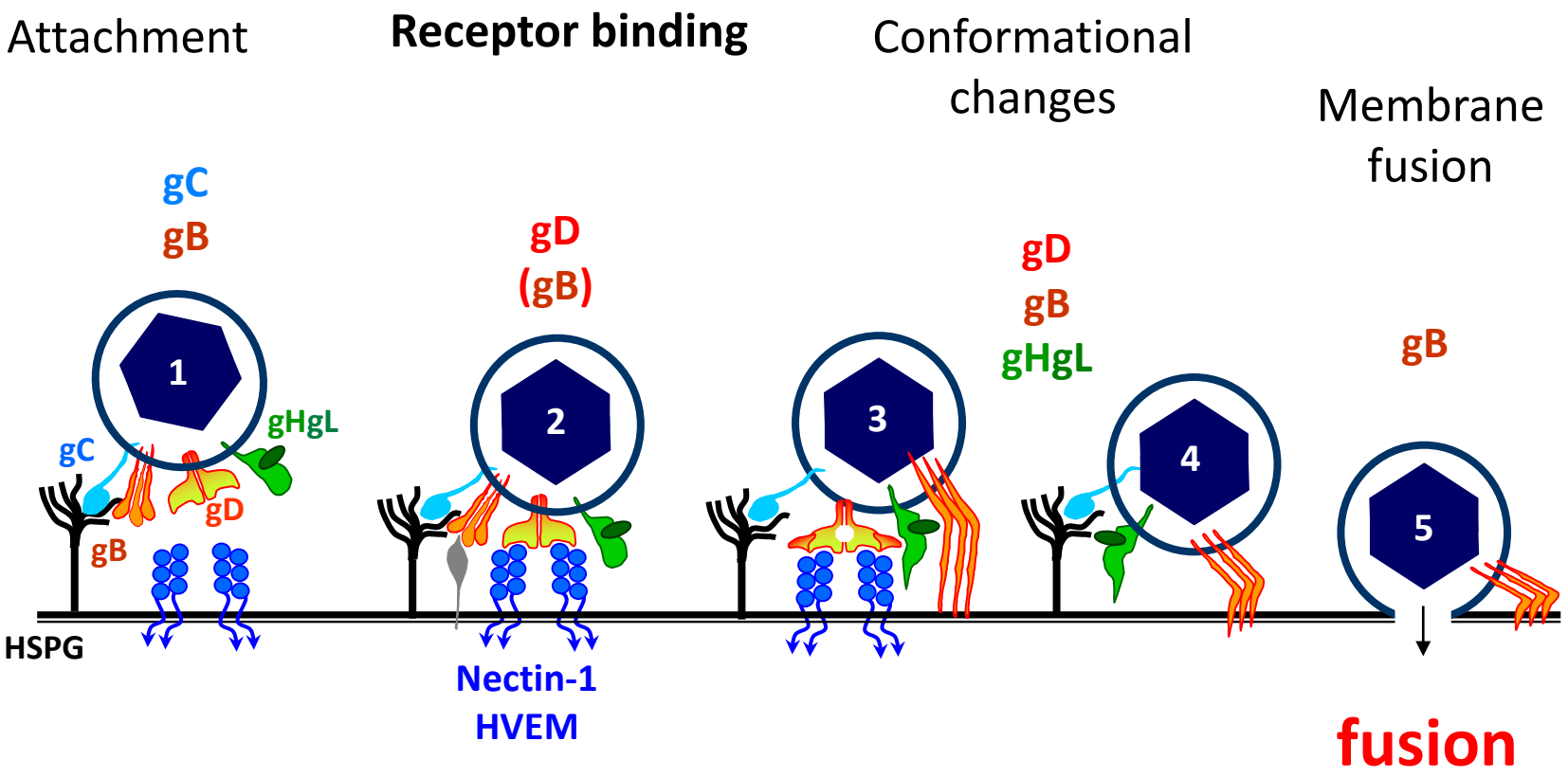
Roz Eisenberg's papers



Eisenberg RJ et al. 188 published article abstracts 1973-2017

How to understand HSV entry glycoproteins.

What does it do?
What does it look like?



How to understand HSV entry glycoproteins.

What does it do?
What does it look like?

Purify proteins.

- Recombinant baculoviruses

(grams of highly purified proteins since 1994)

Generate antibodies.

- Polyclonals (274 rabbit sera) and monoclonals (TMTC)

Embrace new technologies.

- Biosensors
- Live cell fluorescence microscopy
- Bimolecular fluorescence complementation
- Molecular biology (> 1112 plasmids)
- Molecular modeling

Collaborate.

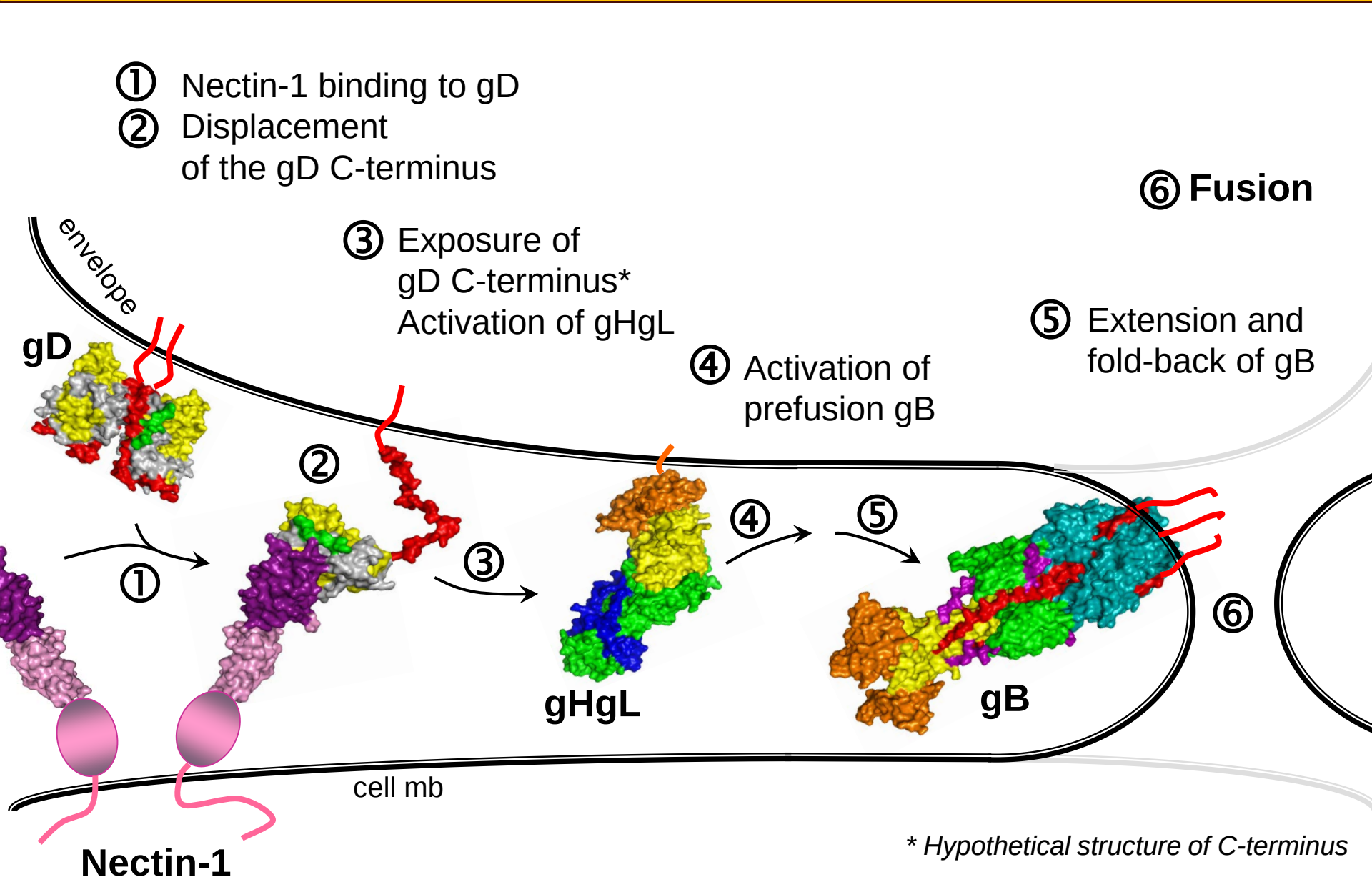
Crystallography
- Don Wiley (Harvard)
- Stephen Harrison (Harvard)
- Andrea Carfi (Merck/ Novartis)
- Katya Heldwein (Tufts)

Receptors
- Pat Spear (Northwestern U)

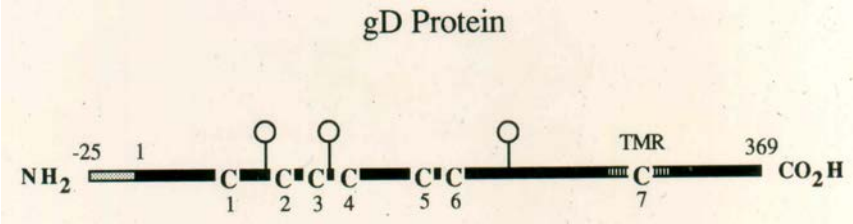
Vaccines
- Harvey Friedman (PENN)
- Small and large companies

And others…

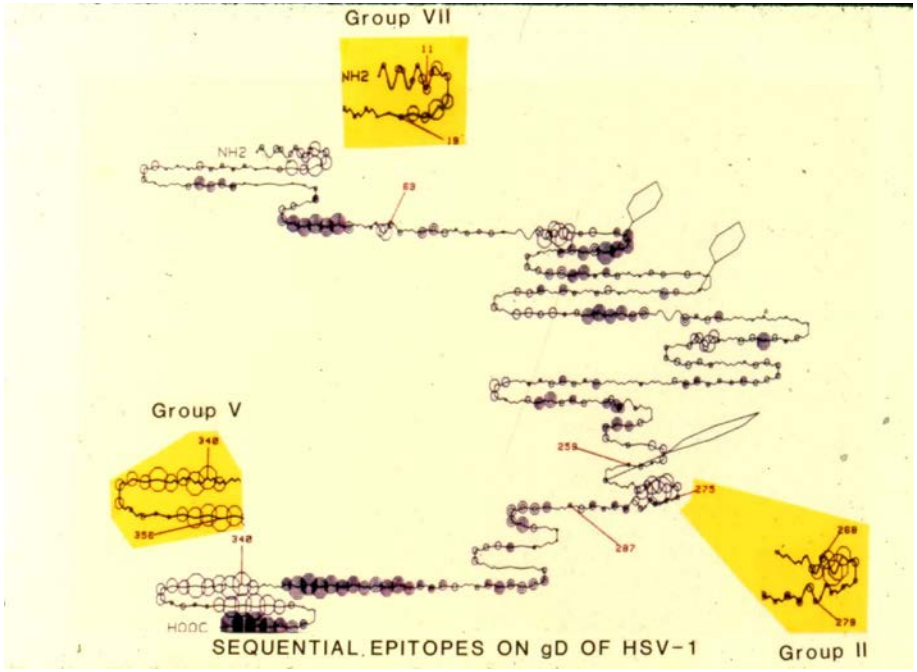
HSV entry glycoproteins: what they do and what they look like !



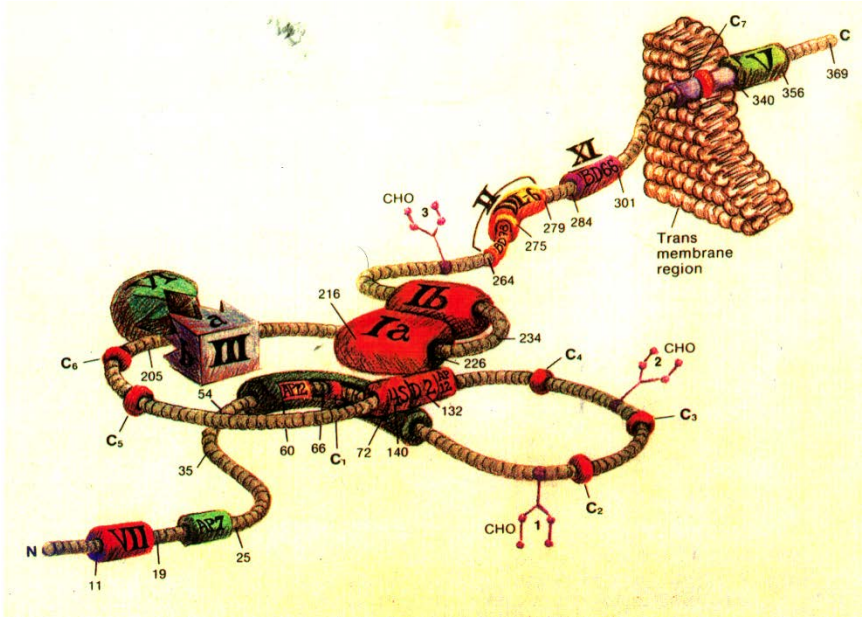
HSV gD



CIRCA 1982

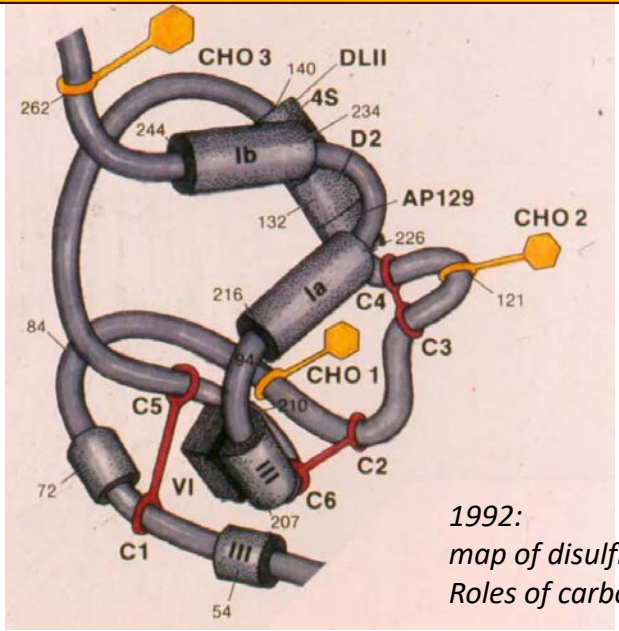


CIRCA 1985: Epitope mapping and molecular modeling (collab. E. Golub)

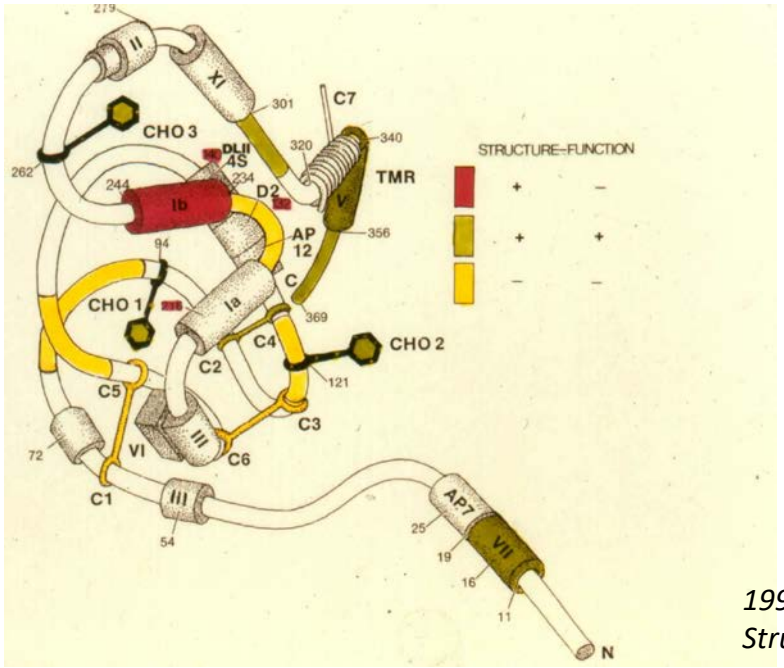


CIRCA 1990: introduction of Art. Initial folding

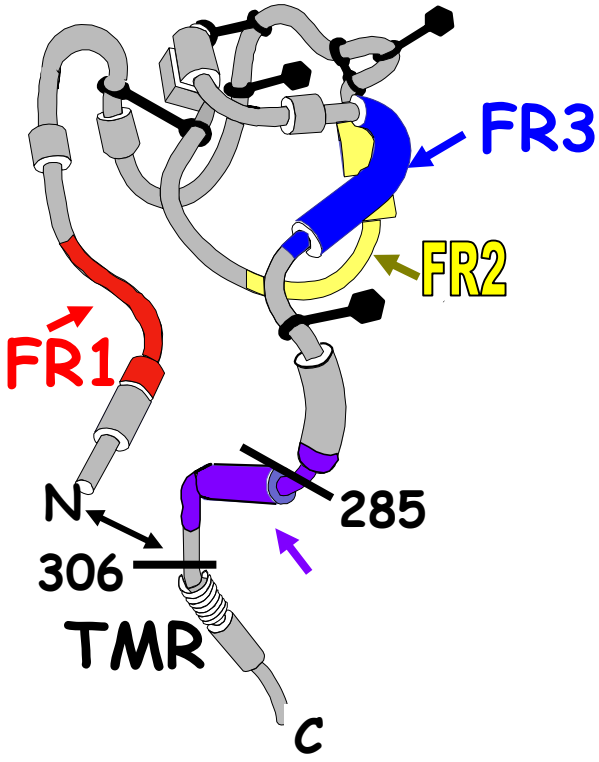
HSV gD



1992:
map of disulfide bonds.
Roles of carbohydrates

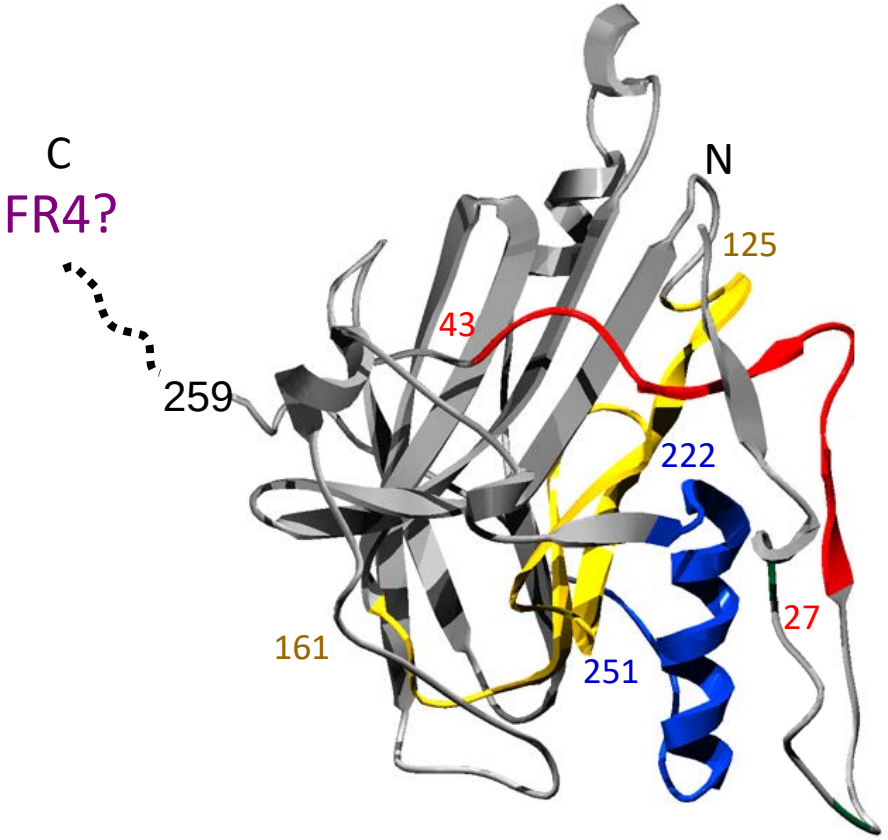


1995: more folding
Structure-function analysis

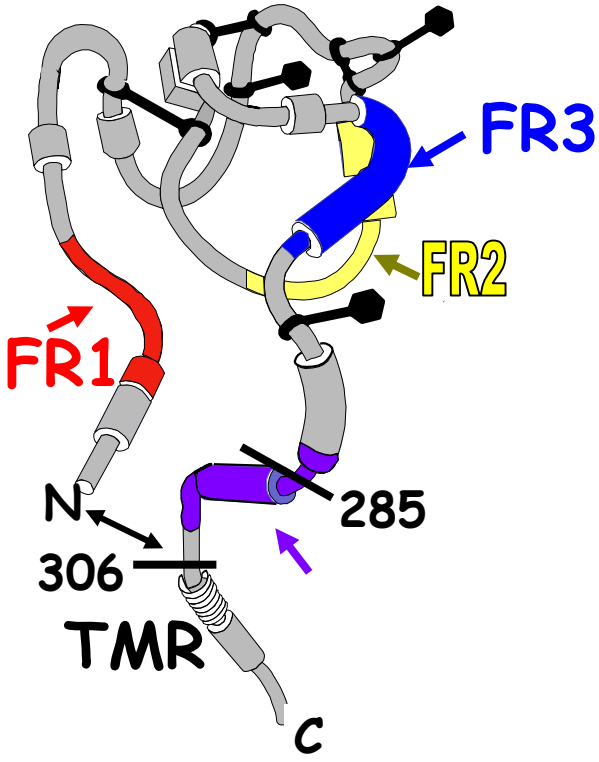


1994: Baculovirus production (gD306t)
1994: Identification of 4 functional regions (FR)
1994-2000: Bac production of gD variants to analyze functional regions

HSV gD



2001: crystal structure of gD (collab: D. Wiley and A. Carfi).
Arrangement of FR confirmed
Disulfide bonds confirmed



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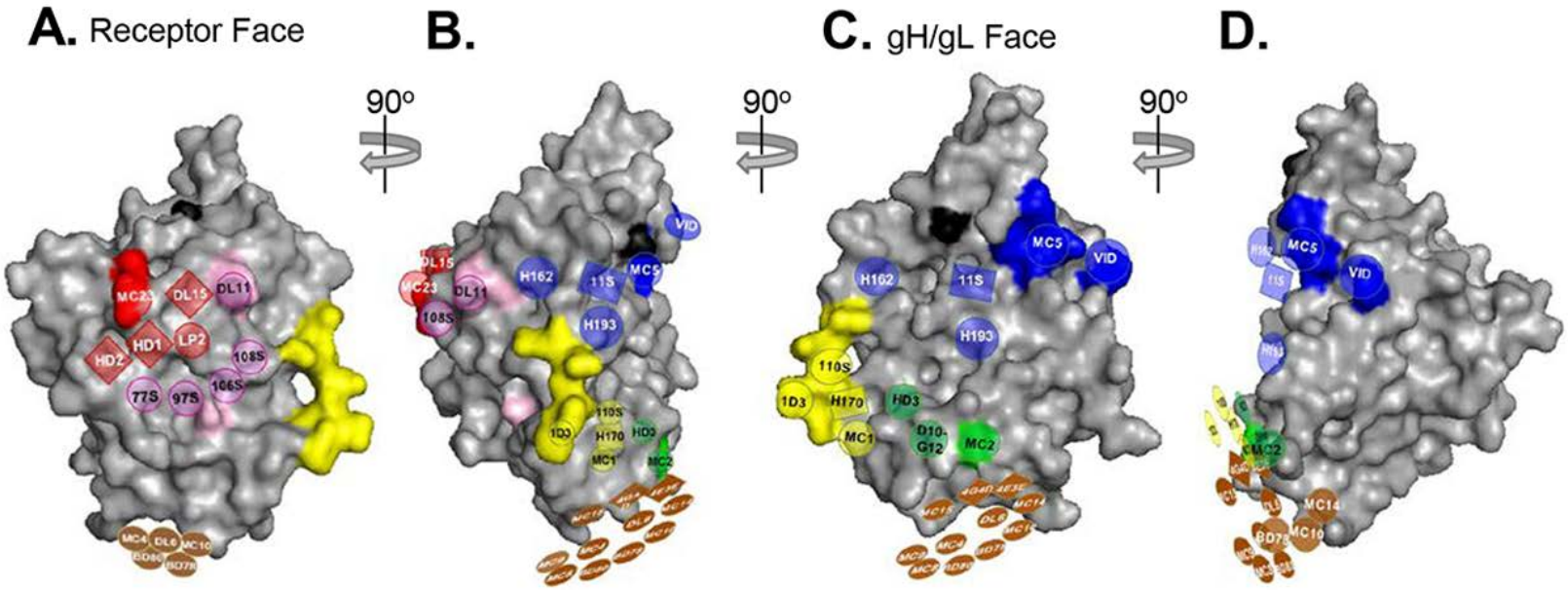
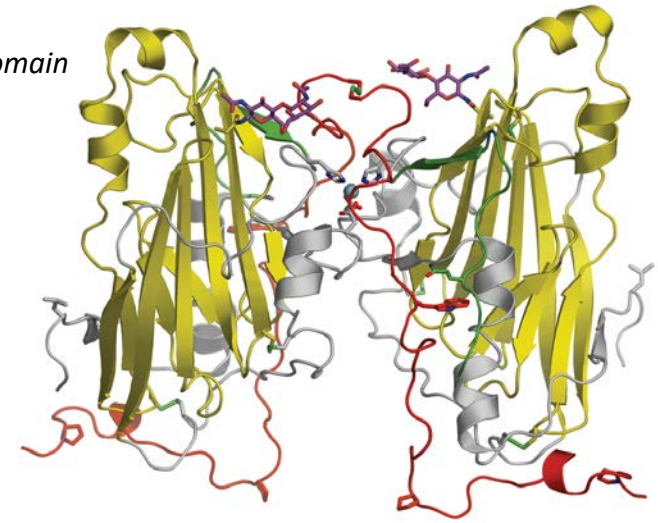
HSV gD

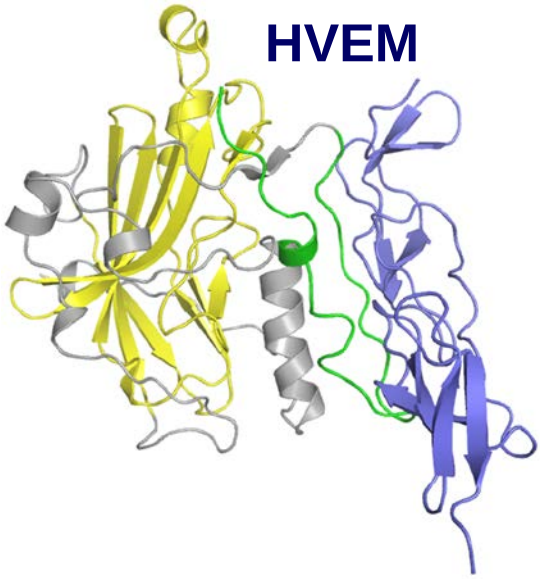


2017: Global sensing of the antigenic structure of herpes simplex virus gD using high-throughput array-based SPR imaging. Cairns TM, Ditto NT, Lou H, Brooks BD, Atanasiu D, Eisenberg RJ, Cohen GH. PLoS Pathog. 2017 Jun 14;13(6):e1006430.

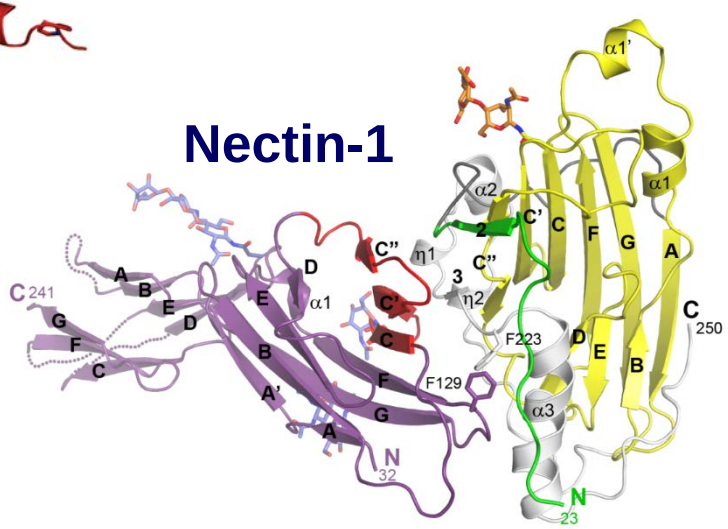
HSV gD

2005: crystal structure of gD full ectodomain (collab: A. Carfi).
Arrangement of FR4 confirmed.





1997: HVEM identified as receptor for gD (Spear lab)
2001: crystal structure of gD bound to HVEM (collab: D. Wiley, A. Carfi)

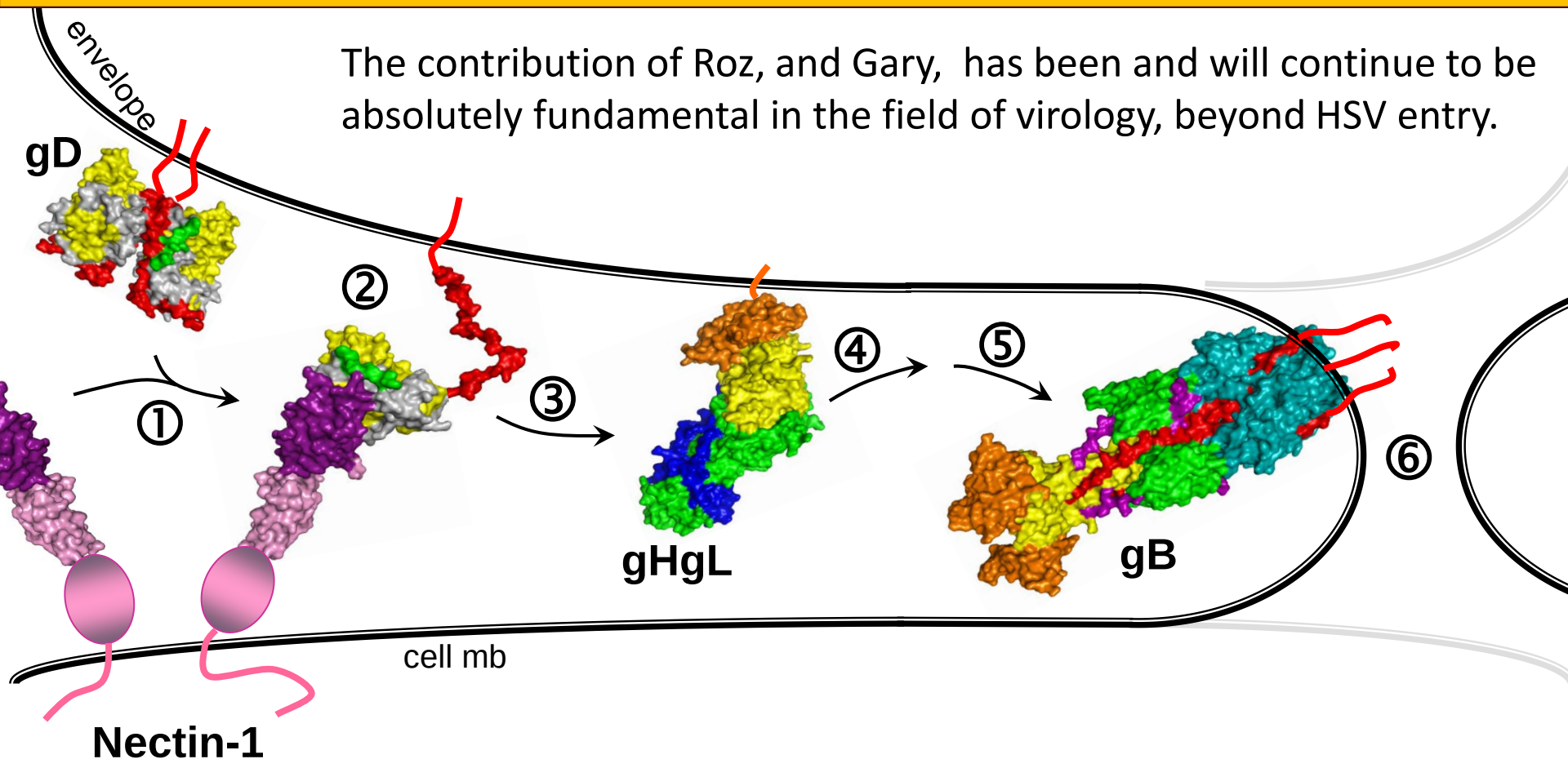


1998: Nectin-1 identified as receptor for gD (collab: Spear lab)
2011: Crystal structure of gD bound to nectin-1 (collab: A. Carfi)

These structures are at the basis of the current functional model of activation of gD by its two main, and very different, receptors.

Roz Eisenberg's influence

The contribution of Roz, and Gary, has been and will continue to be absolutely fundamental in the field of virology, beyond HSV entry.



Roz influenced many labs by mentoring new scientists and sharing a philosophy of science, an approach to studying viral glycoprotein functions and many reagents with many labs. (try to find a paper on herpesvirus entry that does not acknowledge this contribution!)

Thank you Roz, Happy retirement!