

# FT-ICR MS in the analysis of IgA Nephropathy

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**UAB** DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR GENETICS

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## Finnigan LTQ FT-ICR Mass Spectrometer

- Ion Trap based Fourier Transform-Ion Cyclotron Mass Spectrometer
- FT-ICR @ LC timescale
- High Mass Accuracy
- High Mass Resolution



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Thermo ELECTRON CORPORATION

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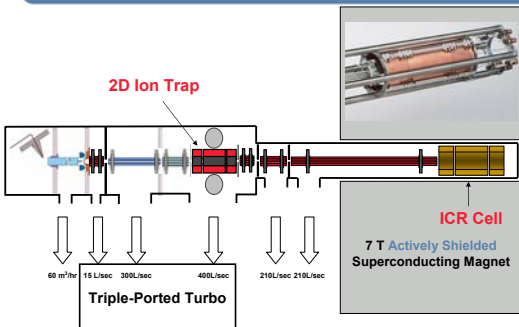
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## Linear Ion Trap – FTICR Hybrid



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Thermo ELECTRON CORPORATION

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## Finnigan LTQ FT-MS System

Introduced 2003



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Analyze • Detect • Measure • Control™  
**Thermo**  
ELECTRON CORPORATION

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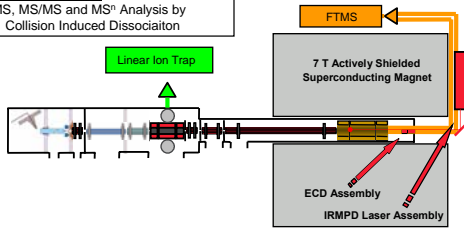
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## ECD and IRMPD with the Finnigan LTQ FT

**Linear Ion Trap MS**  
• MS, MS/MS and MS<sup>n</sup> Analysis by Collision Induced Dissociation

**FTICR MS**  
• Electron Capture Dissociation (ECD)  
• Infra-Red Multiphoton Dissociation (IRMPD)



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Analyze • Detect • Measure • Control™  
**Thermo**  
ELECTRON CORPORATION

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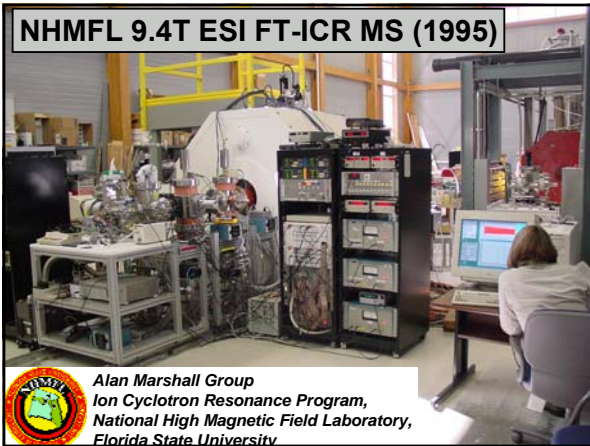
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## NHMFL 9.4T ESI FT-ICR MS (1995)



Alan Marshall Group  
Ion Cyclotron Resonance Program,  
National High Magnetic Field Laboratory,  
Florida State University

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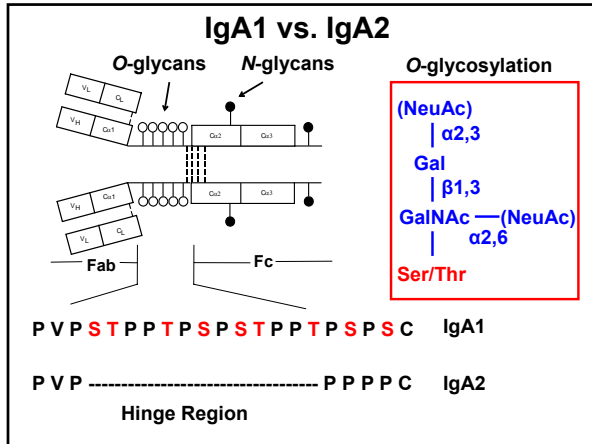
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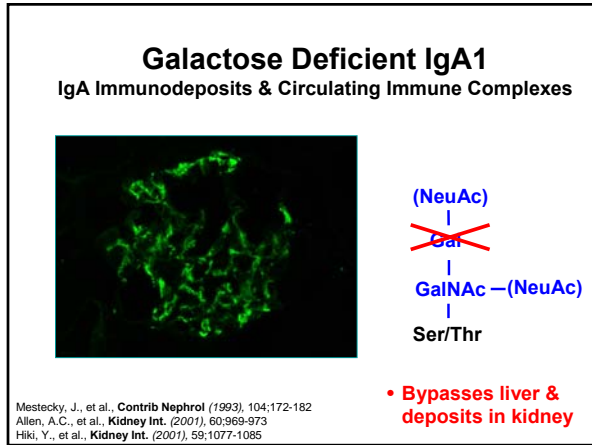
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### Questions concerning IgA1 Hinge Region O-glycosylation

**P V P S T P P T P S P S T P P T P S P S C**

- Heterogeneity of O-glycosylation of IgA1
- Sites of O-glycan attachment  
(N-terminal sequencing methods)
- Gal deficiency in IgAN: randomly or at specific sites  
(Glycan specific lectins: jacalin, HAA)

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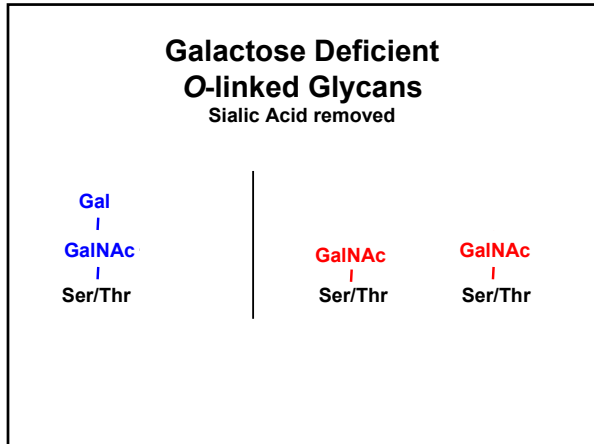
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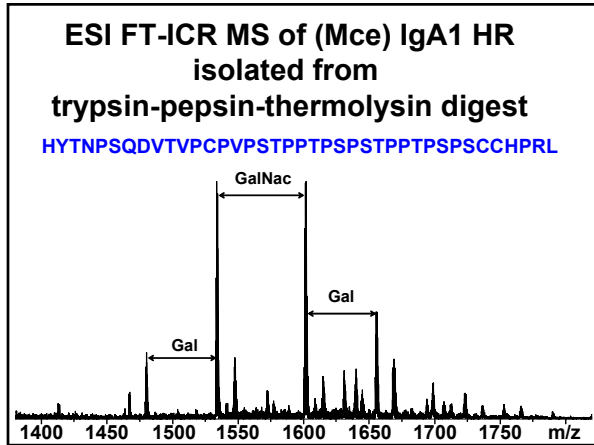
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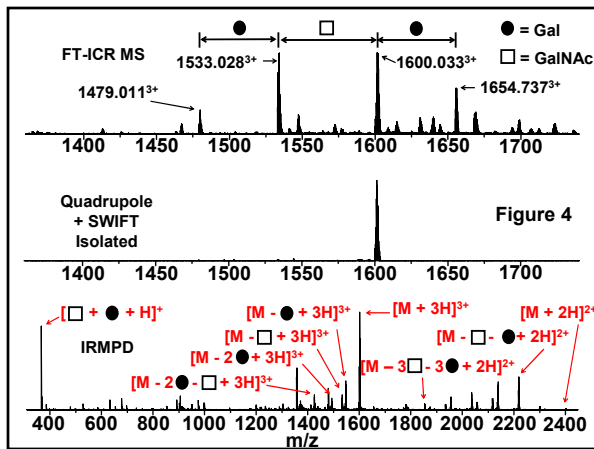
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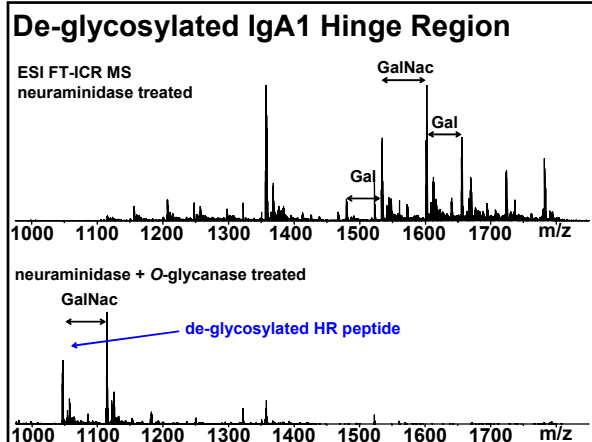
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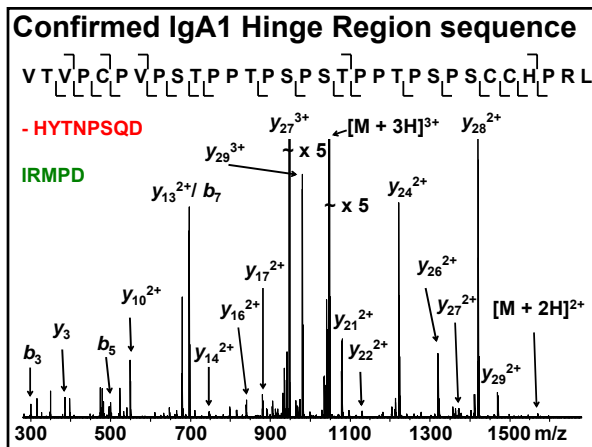
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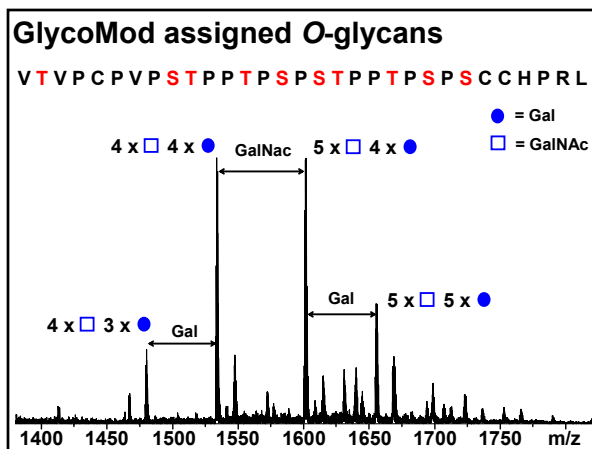
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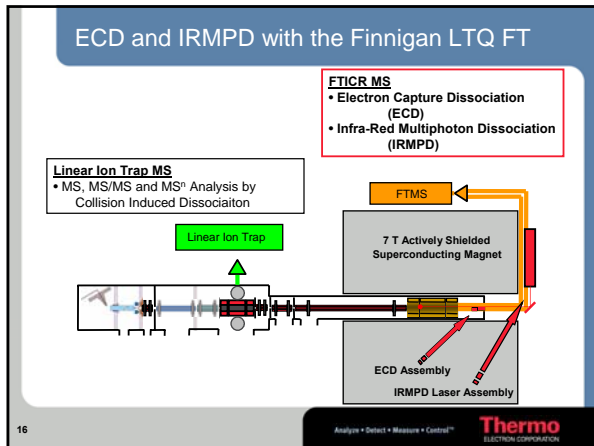
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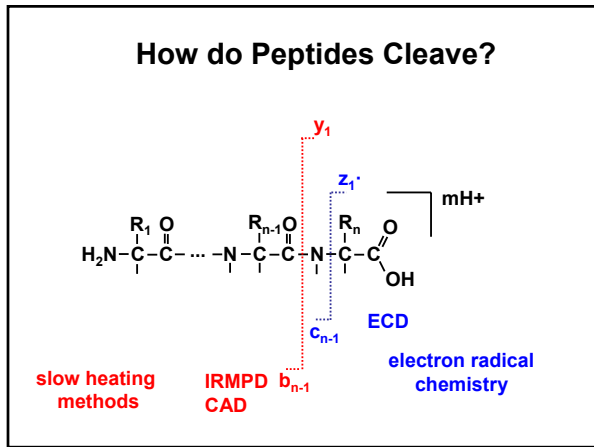
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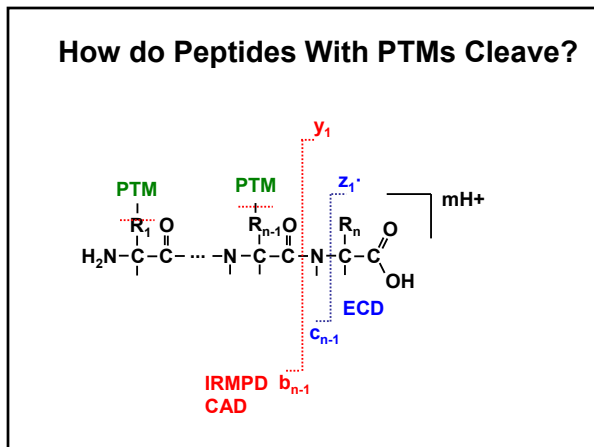
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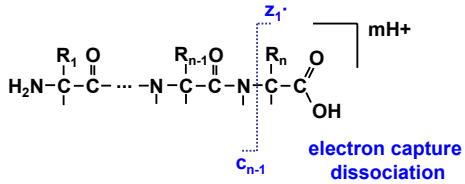
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### Can We Locate O-glycosylation Sites?

VTVPCVPVSTPTPSPSTPTPSPSCCHPRL  
**T**            **ST**   **T** **S** **ST**   **T** **S** **S**  
 PV**PSTPTPSPSTPTPSPS**  
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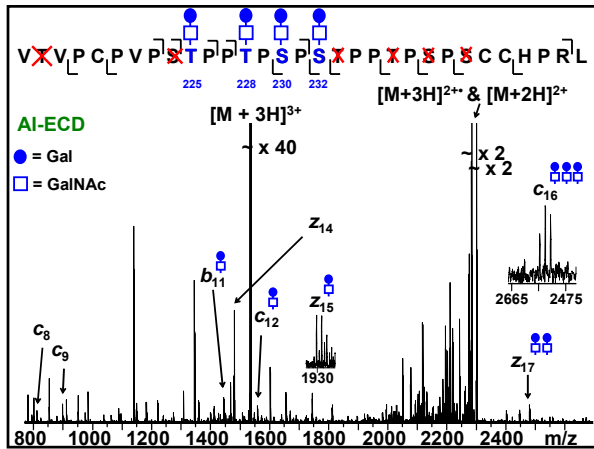
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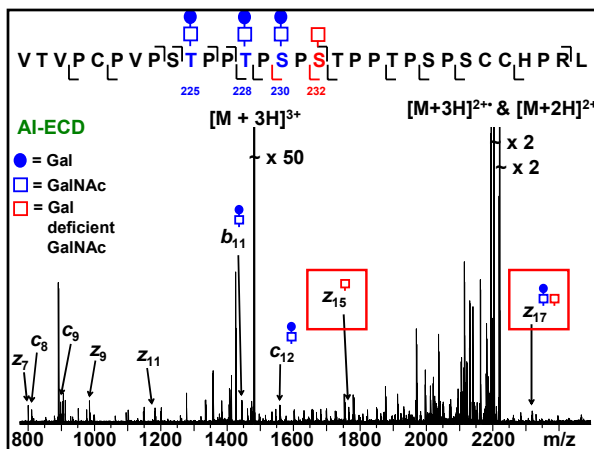
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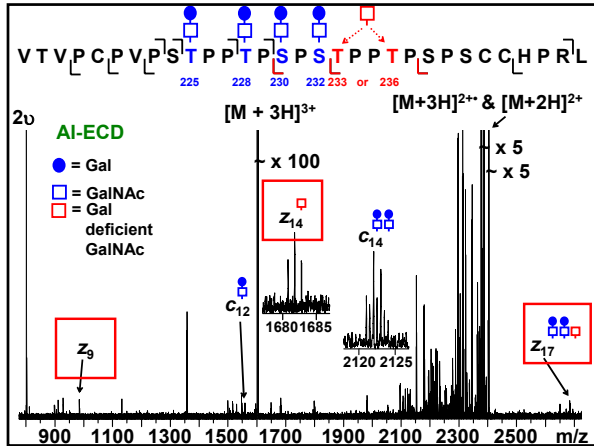
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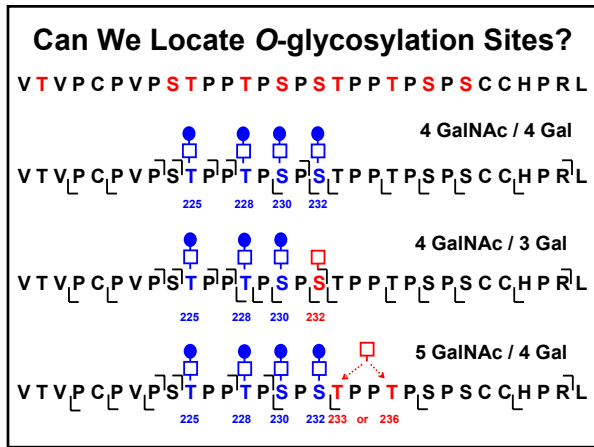
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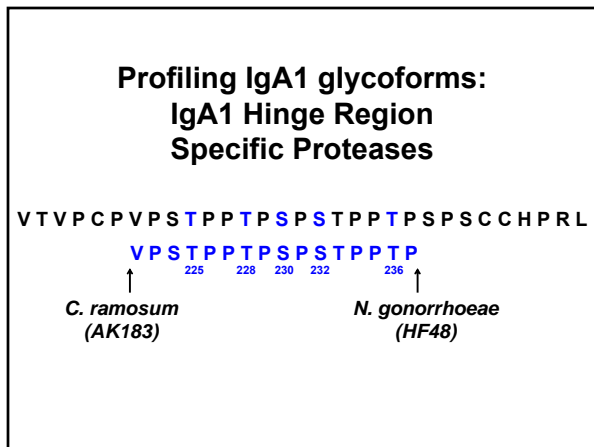
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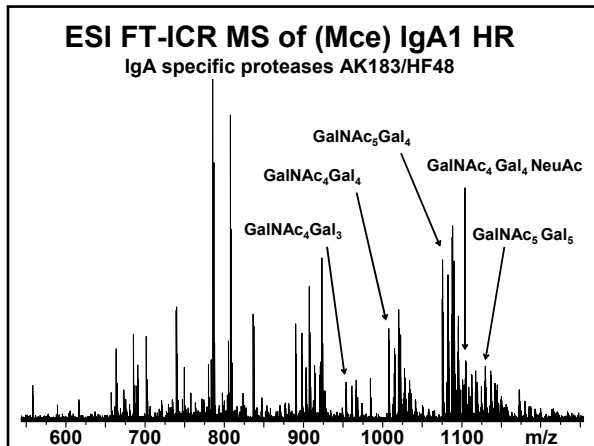
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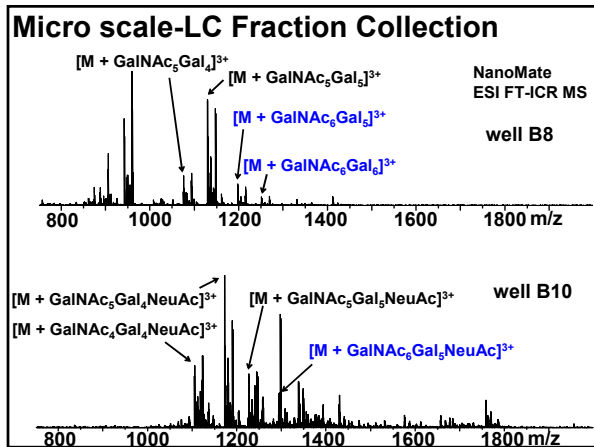
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**Chip-based ESI source**  
**NanoMate by Advion**

- 20x20 array of 8 μm nozzles
- ~300 nl/min flow
- Sample as low as 1 μl from 3 total
- 3 μl can produce ~30-40 min spray

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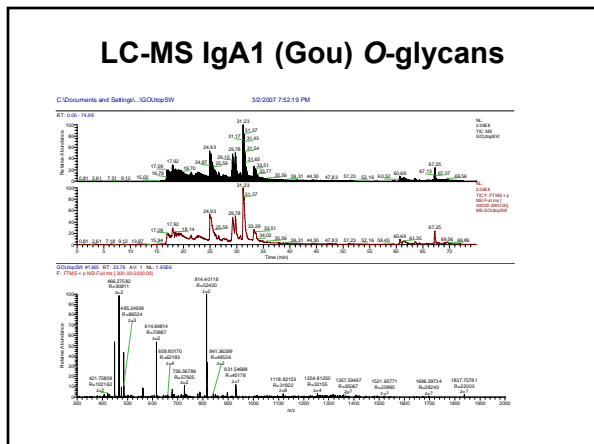
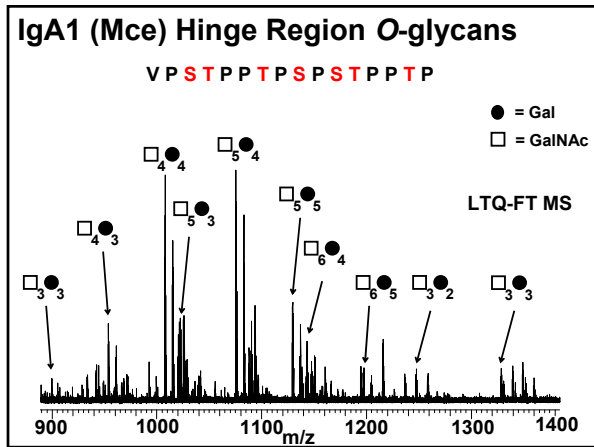
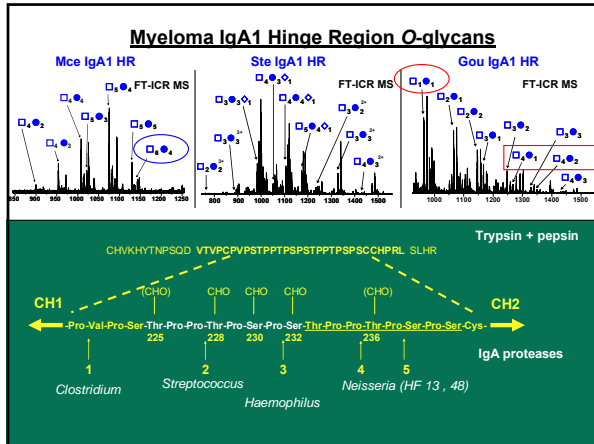
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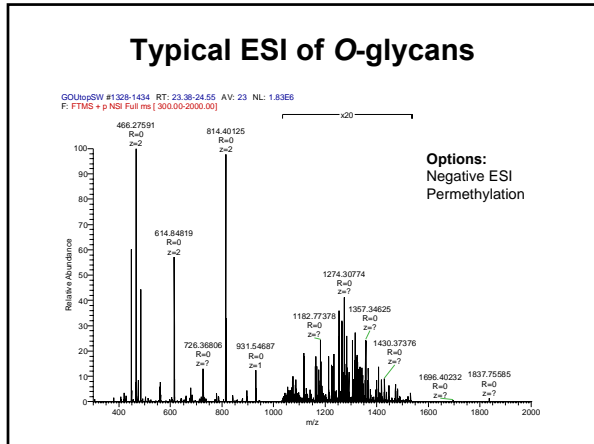
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## FT-ICR MS for the diagnosis IgA Nephropathy?

- IgAN patients
  - Severe symptoms
  - Moderate symptoms
- Non-IgA related glomerulonephritis
- Normal healthy controls

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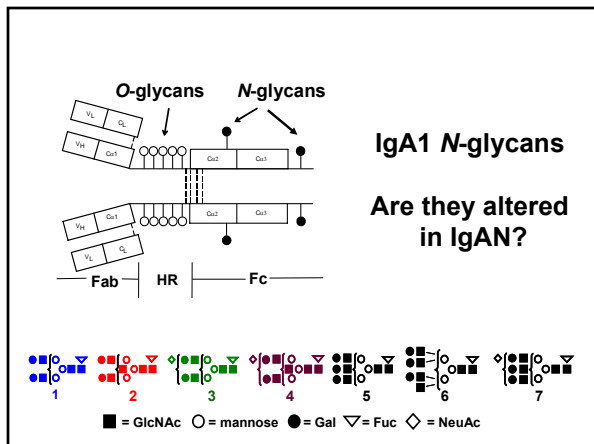
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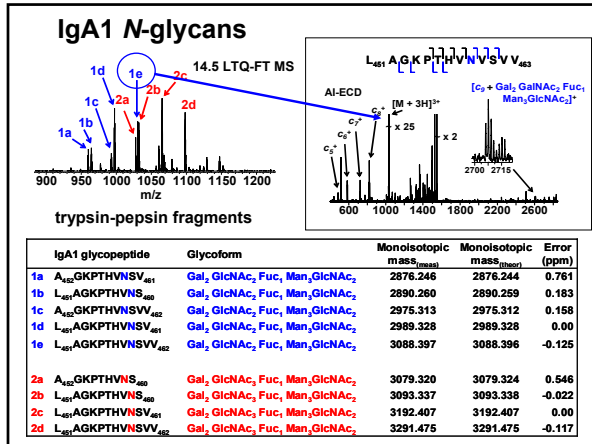
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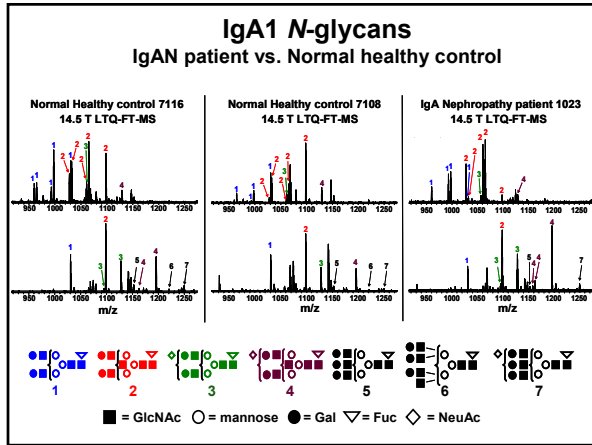
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