

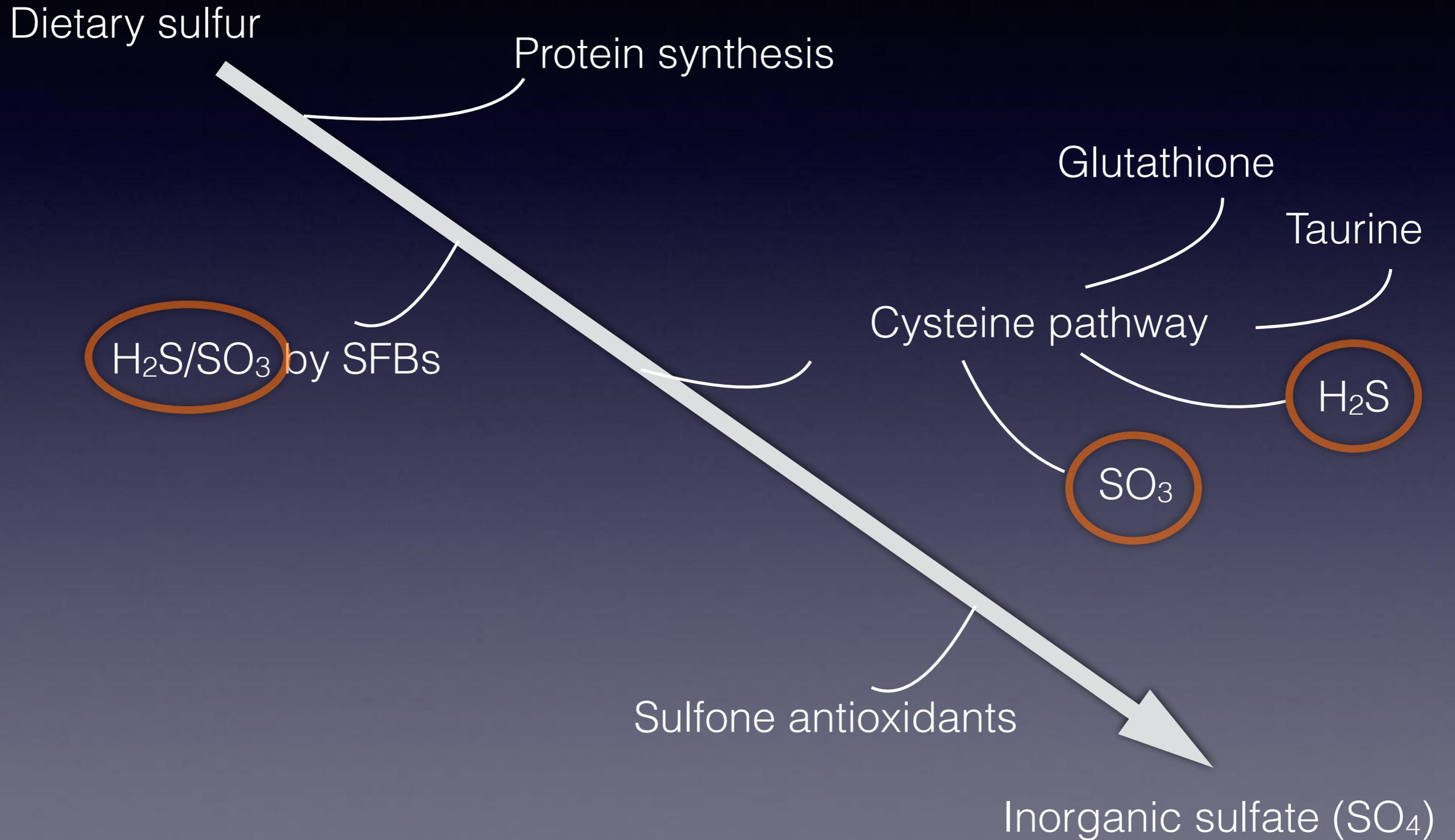
Sulfur, Water, and Light: The Golden Braid That Weaves Us Into Wholeness

12th Annual Conference on the Physics,
Chemistry and Biology of Water
Sofia, bulgaria
October 26-29, 2017

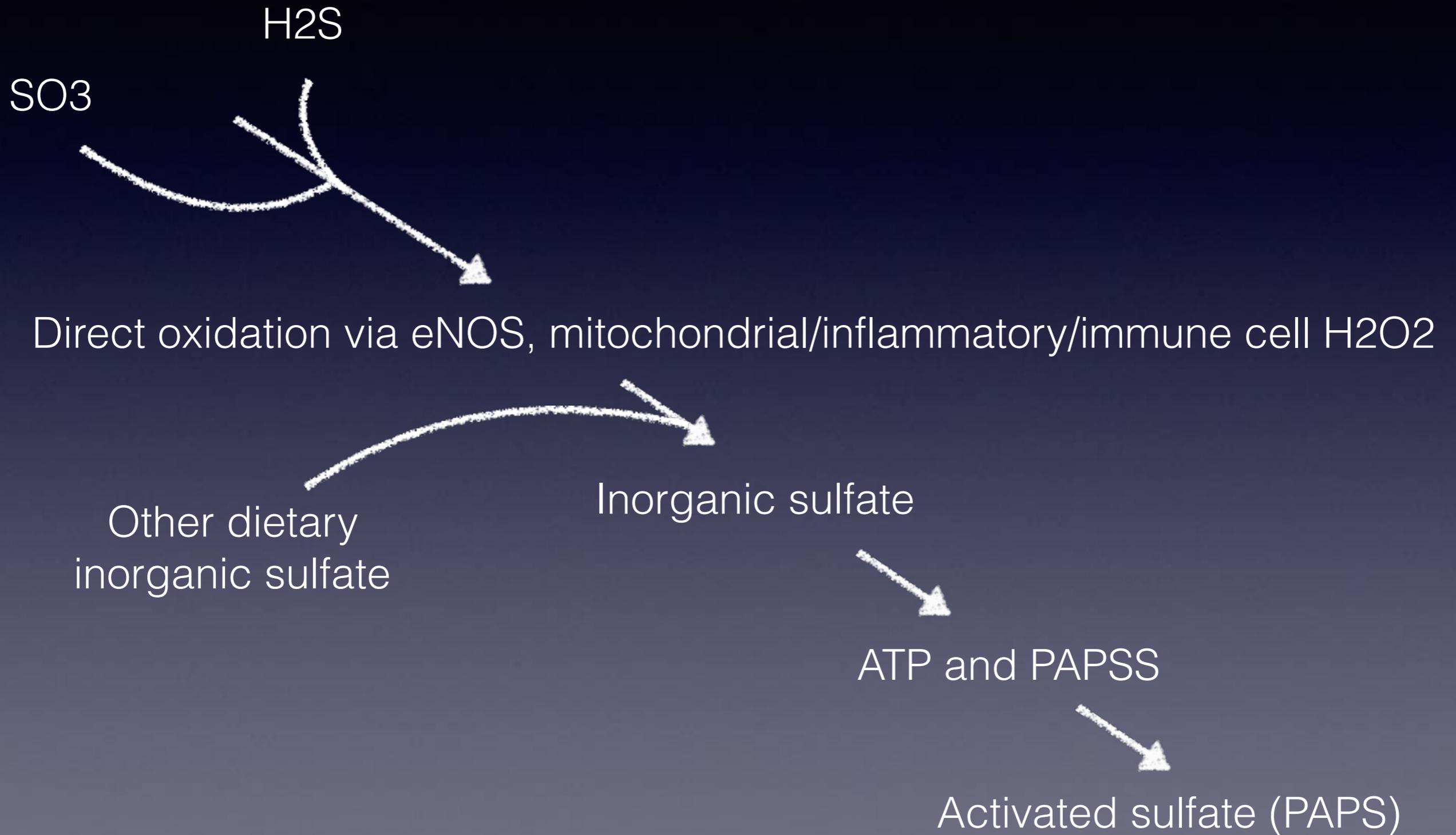
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The First Thread: Sulfur

Sulfur 101



Sulfur 201



Sulfur 301

PAPS

Water structure

Hormone sulfation

Heparan sulfate

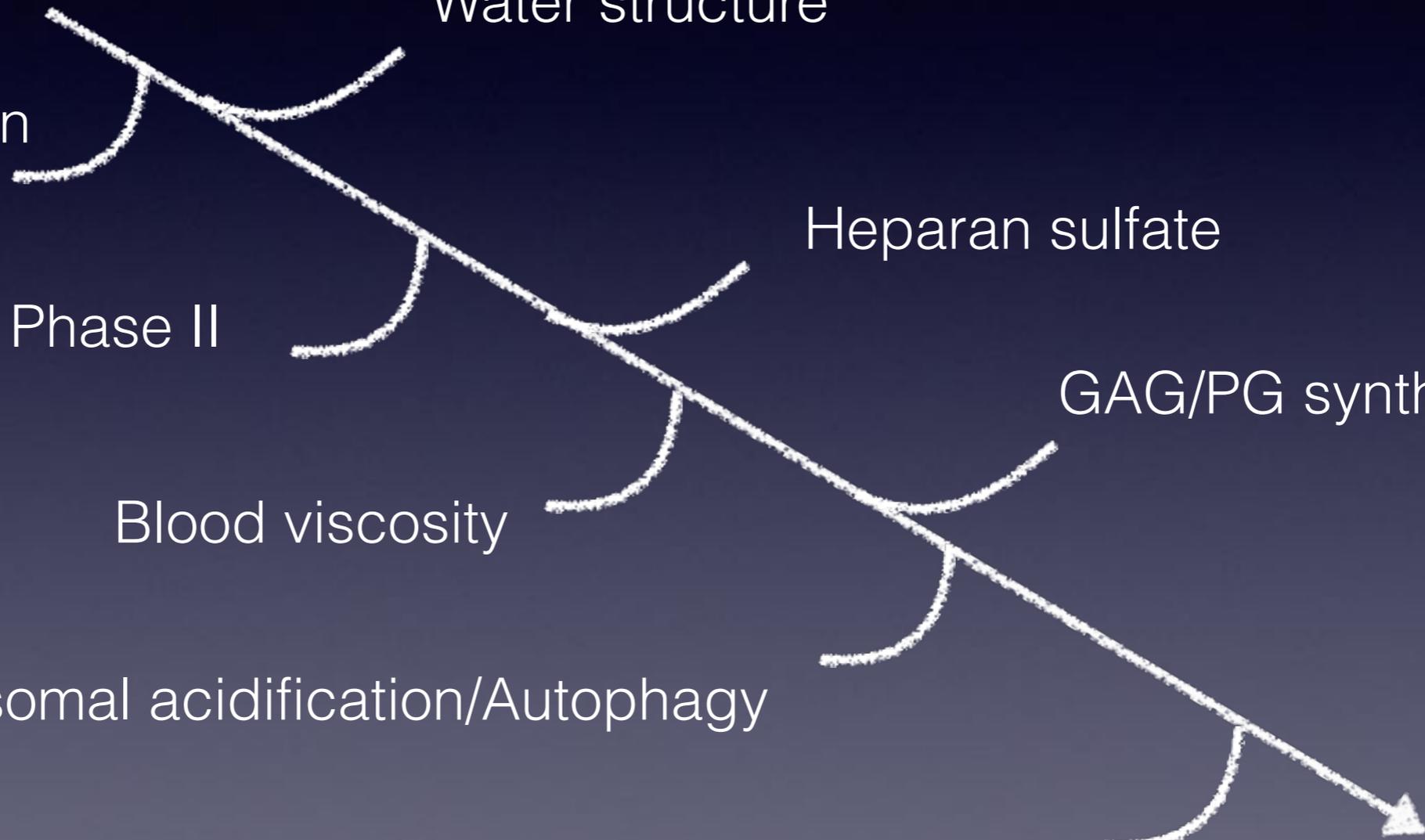
Liver Phase II

GAG/PG synthesis

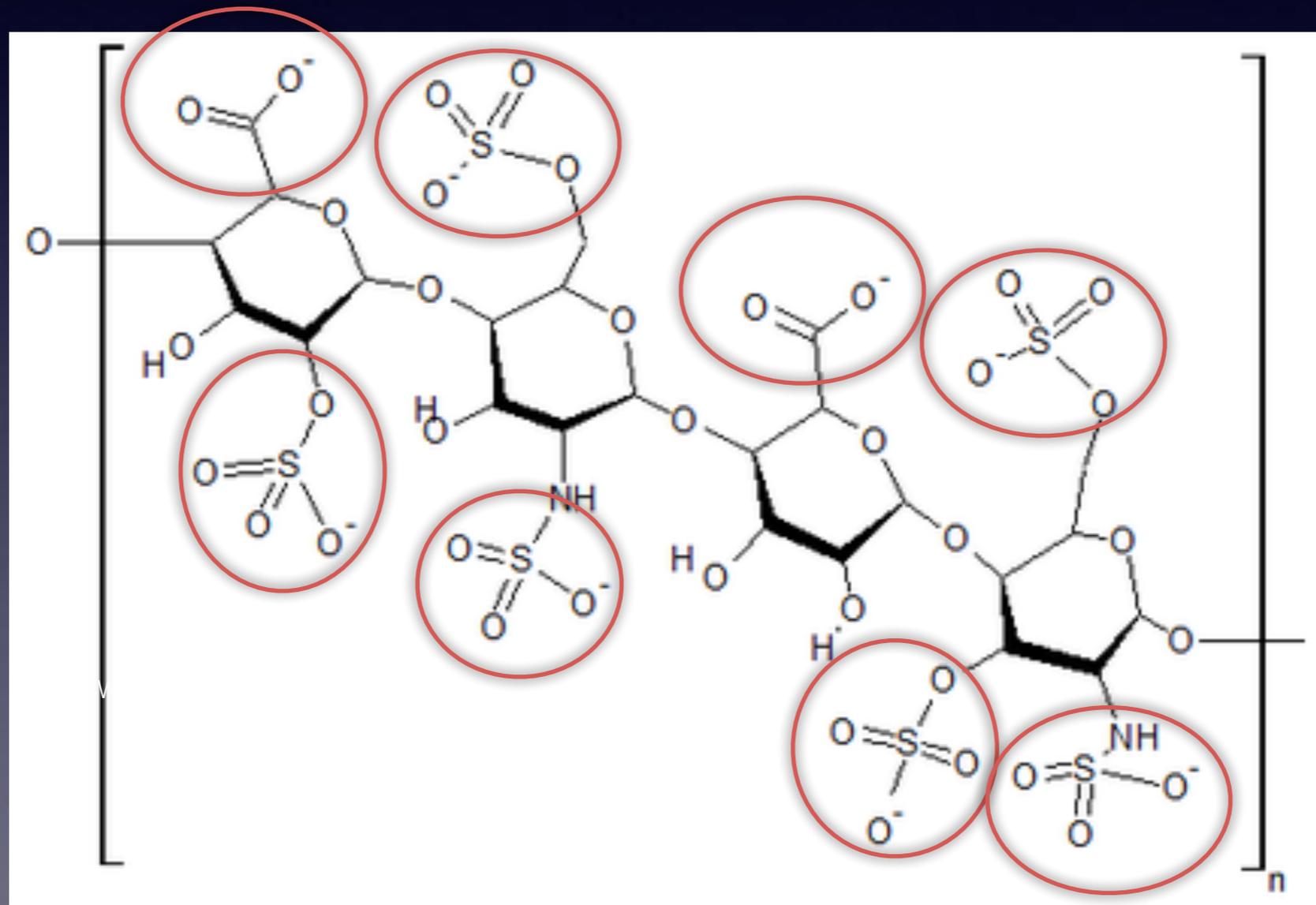
Blood viscosity

Lysosomal acidification/Autophagy

Glucose/energy utilization



Heparan Sulfate



HSPG

- “Here, we provide a comprehensive overview of the various roles of HSPGs in these systems and explore the concept of an instructive **heparan sulfate sugar code** for modulating vertebrate development.”

doi: 10.1242/dev.098178

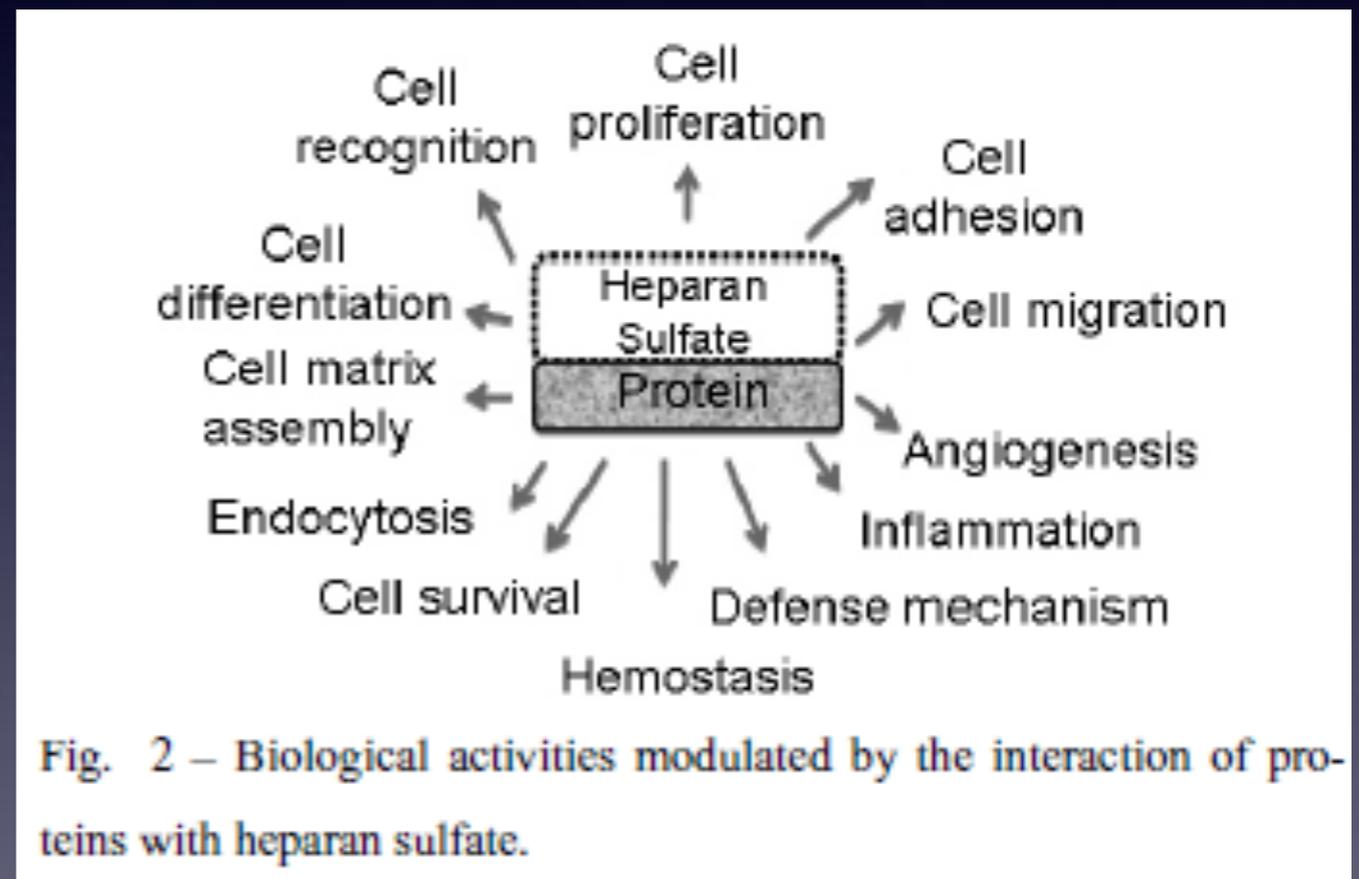


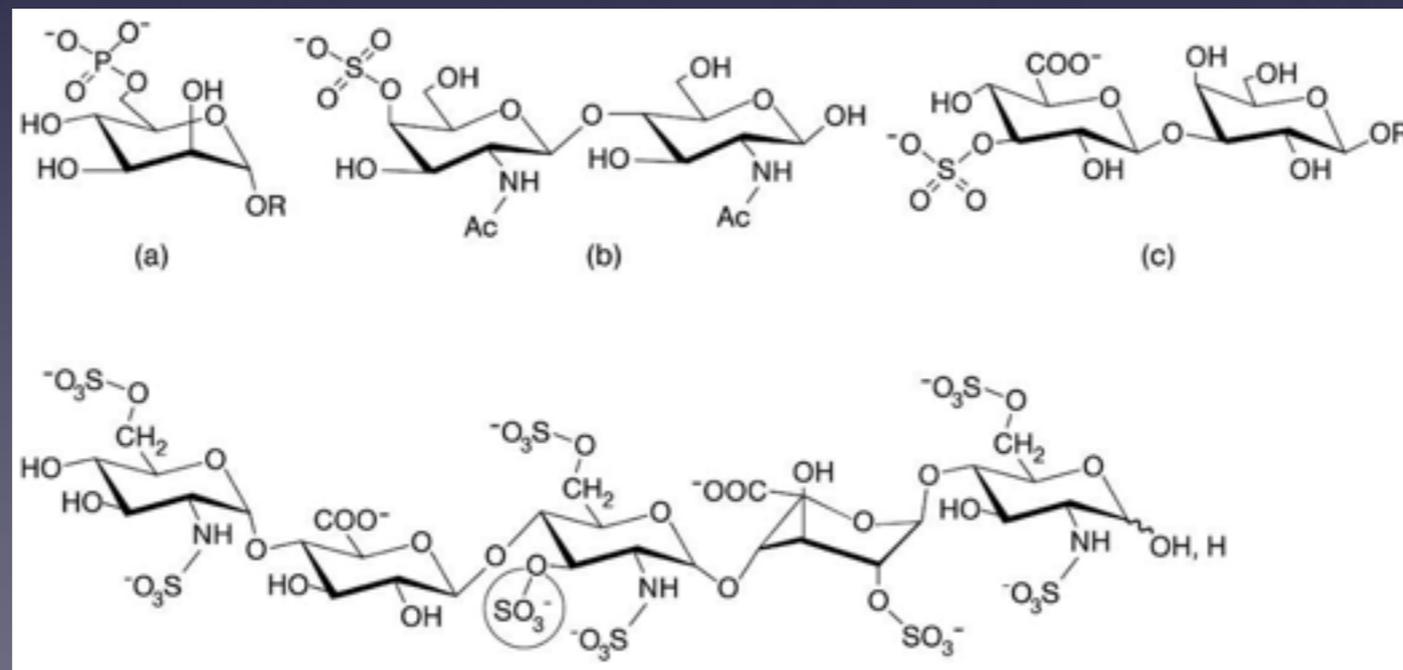
Fig. 2 – Biological activities modulated by the interaction of proteins with heparan sulfate.

<http://dx.doi.org/10.1590/S0001-37652009000300007>

Sort of An Aside: The Sugar Code

- “It may be that as much control over the cell’s fate, and as much of the language of life’s unfolding, reside on the cell’s surface as in its nucleus.” Schnaar, R. L. (1985), THE MEMBRANE

IS THE MESSAGE. *The Sciences*, 25: 34–40. doi:10.1002/j.2326-1951.1985.tb02917.x



Gabius, Hans-Joachim. "The sugar code: Why glycans are so important." *Biosystems* (2017).

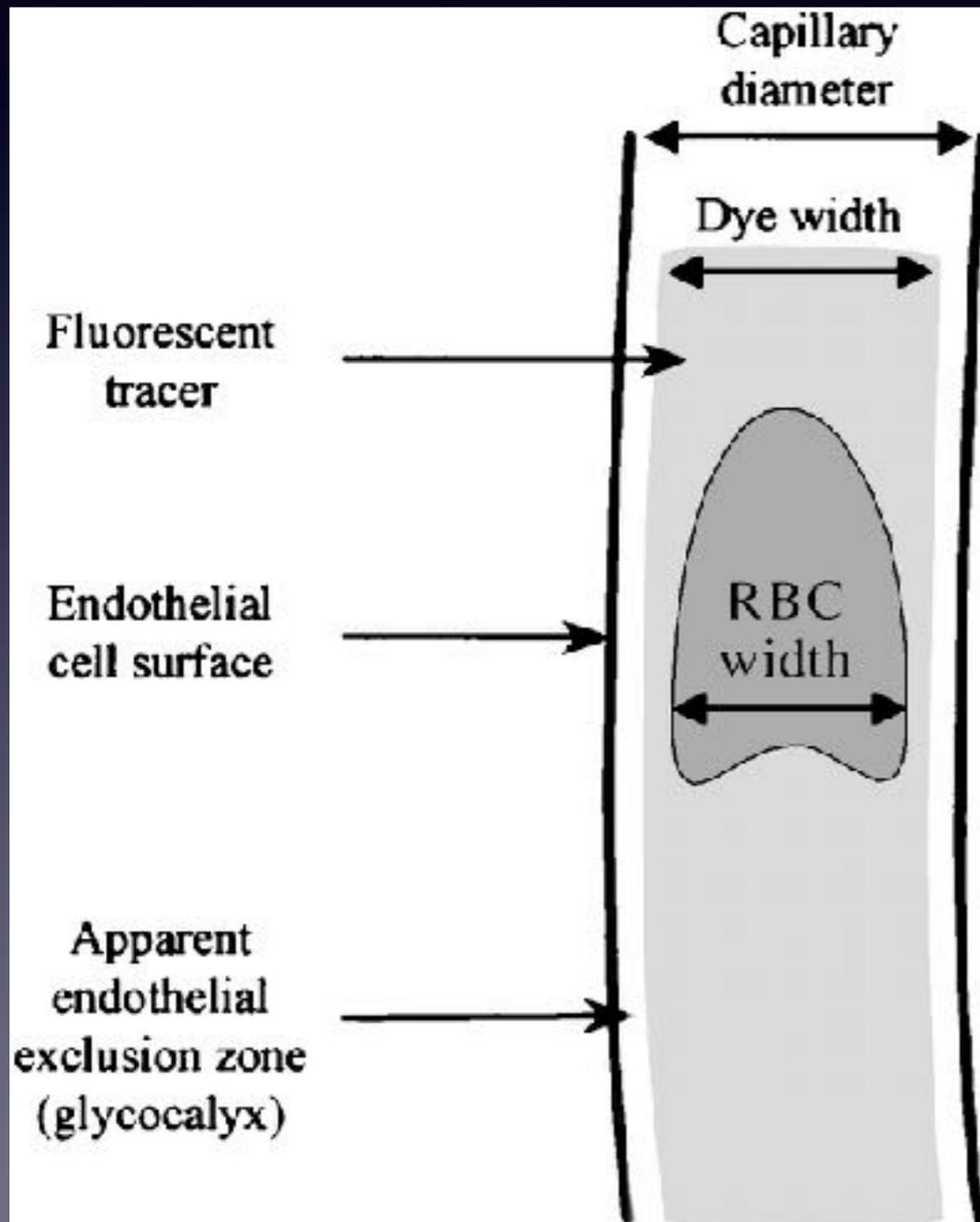
It's (Almost) All About the Charge

- Heparan sulfate, proteins, glycans and sialic acid impart a dense negative charge to cell surfaces, interiors, the ECM, blood, and the whole shebang.
- Yeah, and...?

Water

Evidence in Biology

American Journal of Physiology - Heart and Circulatory
Physiology Jan 2000, 278 (1) H285-H289



“We found that water structure and not merely water content is a significant mechanism underlying relaxation time changes and signal intensity changes in acute stroke.” Unger, Evan, James Littlefield, and M. Gado. "Water content and water structure in CT and MR signal changes: possible influence in detection of early stroke." *American journal of neuroradiology* 9.4 (1988): 687-691.

MRI

- EZ water is considerably more restricted in its movement, and thus appears different on MRI
- Malignant tumors appear different on MRI due to the loss of EZ water in the environment of malignancy.
Cause or effect?

On Collagen

- Main protein in the ECM
- Makes up 25%-35% of body protein; most abundant protein in mammals.
- “The water molecules around the carbonyl and hydroxyprolyl groups show distinctive geometries. There are repetitive patterns of water bridges that link oxygen atoms within a single peptide chain, between different chains and between different triple helices. Overall, the water molecules are organized in a semi-clathrate-like structure that surrounds and interconnects triple helices in the crystal lattice.” [https://doi.org/10.1016/S0969-2126\(01\)00224-6](https://doi.org/10.1016/S0969-2126(01)00224-6)

Protein Hydration Water

7584

J. Phys. Chem. B 2007, 111, 7584–7590

How Protein Surfaces Induce Anomalous Dynamics of Hydration Water

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Received: March 2, 2007; In Final Form: April 26, 2007

Water around biomolecules slows down with respect to pure water, and both rotation and translation exhibit anomalous time dependence in the hydration shell. The origin of such behavior remains elusive. We use molecular dynamics simulations of water dynamics around several designed protein models to establish the connection between the appearance of the anomalous dynamics and water-protein interactions.

Water Respiration

- Where EZ water interfaces with bulk water, electrons transfer from the EZ to the bulk
 - EZ water undergoes oxidation (loses electrons)
 - Bulk water is reduced (gains those electrons)
 - The chemical equations describing this process reveal that 2 H₂O₂ molecules are produced
- Energy in the visible red wavelength (800nm) is released as the water is “burned” in this way

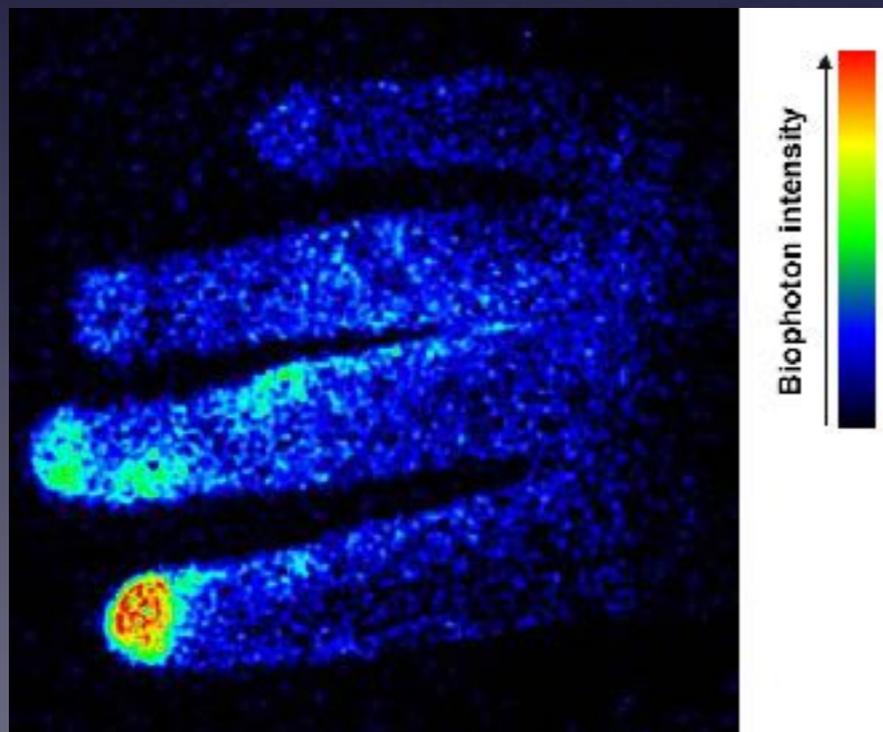
The Punch Line

- Our bodies are filled with hydrophilic surfaces
 - Every cell surface, the cell interior, membranes, connective tissue, proteins, even blood!
- We are chalk full of EZ water. The EZ water is established, at least in large part, via sulfur compounds, and its maintenance is tantamount to our health

Light

The Role of ROS

- When SOD quenches H_2O_2 , a photon of wavelength $\sim 1269\text{nm}$ is released (near infrared)



“[T]he biophoton spectrum dominantly covers the 600-650 nm wavelength region, corresponding to the orange and red color region... The ROS-promoted lipid peroxidation process is primarily involved in emission mechanisms.”

Biophoton Communication: Can Cells Talk Using Light?

A growing body of evidence suggests that the molecular machinery of life emits and absorbs photons. Now one biologist has evidence that this light is a new form of cellular communication.

May 22, 2012

<http://tinyurl.com/jdvu8k2>

<http://arxiv.org/abs/1205.4134>

“It was found... that such radiation perform the communications between distant samples, which result in the synchronization of their development.”

- Light is a means of cell-to-cell communication

“This study finds that cells can have an influence on other cells even when separated with a glass barrier, thereby disabling molecule diffusion through the cell-containing medium...”

Altogether the study strongly supports a cellular communication system, which is different from a molecule-receptor-based system and hints that photon-triggering is a fine tuning principle in cell chemistry.

Evidence of Photon Emission from DNA in Living Systems

M. Rattemeyer and F.A. Popp

Laboratorium für Biophotonen, D-6521 Flörsheim

- “We have found evidence that chromatin is a photon emitter... Probably, DNA is the most important ‘ultraweak’ source of photon emissions (or electromagnetic radiation) from living cells.”

Light and Communication

- If cells are communicating with light, that means they are transmitting *information that is encoded in EMFs*
- Water is playing a central role in the generation of these EM signals

Mechanisms

- Glycine substitution
- Impaired sulfate production
 - oxidative stress
 - clotting risk
 - probable atherosclerosis, cancer, connective tissue disorders
- Water structure degradation

Highly Conserved Glycine

- Serine Protease (trypsin, chymotrypsin, etc.)
- LDL receptors
- ACTH precursor
- Collagen

The Glycine Switch

- “Several HS proteoglycans contain multiple contiguous Ser-Gly attachment sites... PMID: 20301236
- “Strikingly, trypsin’s activation domain contains 4 crucial glycine rich subdomains... Utilizing 3 different assay methods, Samsel and Seneff reported that purified trypsin, upon dissociation, had been found to contain radiolabeled glyphosate to a concentration of 62 ppb, strongly suggesting that glyphosate is substituting for at least some of these glycine residues.” Glyphosate and Anencephaly paper, previously cited.
- Toxic effects have been documented at parts per *trillion*

Glyphosate pathways to modern diseases V: Amino acid analogue of glycine in diverse proteins

Anthony Samsel^{1, *} and Stephanie Seneff^{2, **}

https://www.polygree.com/sites/default/files/attached_question/glyphosate_pathways_to_modern_diseases_v-_amino_acid_analogue_of_glycine_in_diverse_proteins_fnl_published.pdf

Glyphosate pathways to modern diseases VI: Prions, amyloidoses and autoimmune neurological diseases

Anthony Samsel¹ and Stephanie Seneff^{2, *}

<http://www.amsi.ge/jbpc/11717/25SA16A.pdf>

Can glyphosate's disruption of the gut microbiome and induction of sulfate deficiency explain the epidemic in gout and associated diseases in the industrialized world?

Stephanie Seneff,^{1, *} Nicholas J. Causton,² Gregory L. Nigh,³ Gerald Koenig^{4, 5} and Dette Avalon⁶

<http://www.amsi.ge/jbpc/21717/04SE17A.pdf>

Glyphosate and Anencephaly: Death by A Thousand Cuts

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²*Naturopathic Oncology, Immersion Health, Portland, OR 97214, USA*

<http://www.sciforschenonline.org/journals/neurology/article-data/JNNB-3-140/JNNB-3-140.pdf>

Sulfate Impairment

- Chelation of Molybdenum
 - necessary for SUOX to convert SO_3 to SO_4
- SUOX has a strictly conserved glycine at position 473
 - substitution with arginine reduces activity by 5 orders of magnitude
- Glyphosate chelates iron, which is necessary for heme synthesis
 - SUOX is a heme-containing enzyme

End Result

- Low sulfate = Low heparan sulfate = Reduced water structuring = Impaired chemical/electrical/EM communication = Pathology



Restoration

- Restore sulfur metabolism
- Supply scaffolding for water structure
- Light up!

Sulfur metabolism

- Sx: skin, gut, brain, heat, heart
- Garlic, onion, kale - Get them out
- Organic molybdenum, HydroxyB12, capsaicin
- Epsom salt baths
- Glucosamine/chondroitin sulfate
- DMSO/MSM

Water structure

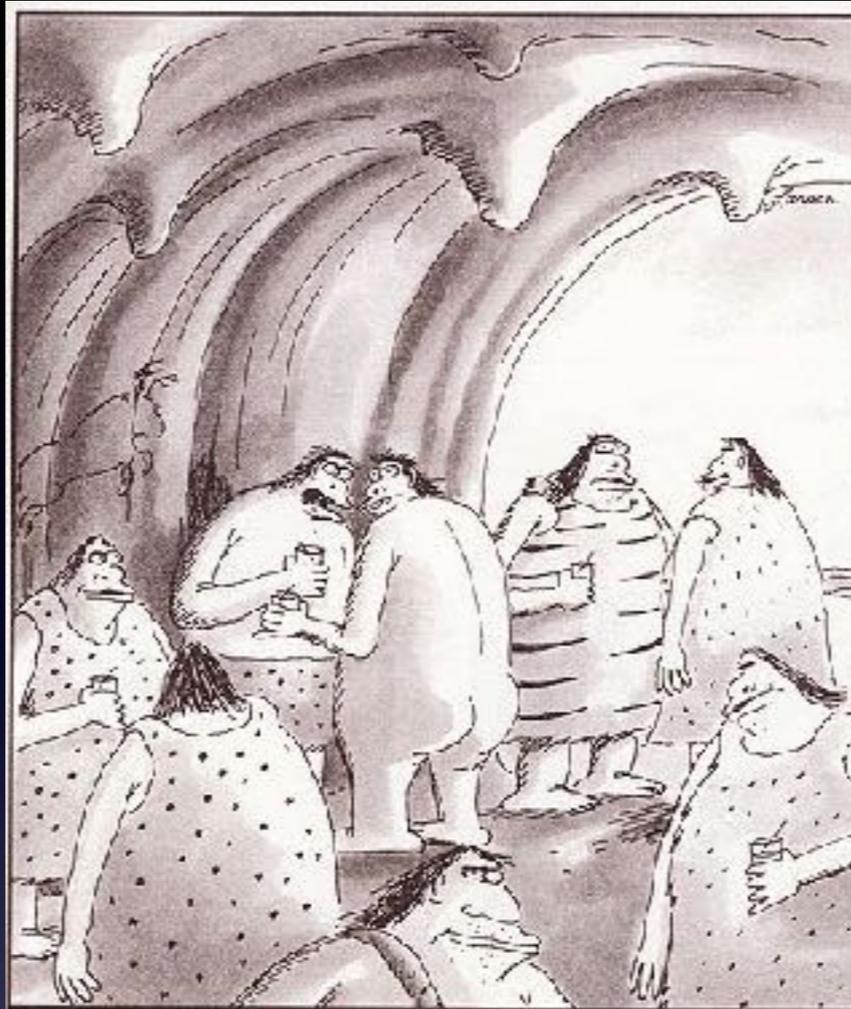
- Drink lots but pee it all out?
- Can't quench thirst?
- Adrenal issues?
- Peptides
- Structured water to drink?

Let There Be Light

- Infrared Sauna!
- Sun exposure, especially morning and evening
- Ultraviolet blood irradiation
- Biomat, IR pads, Therasauna
- Earthing - Refills the electron tank of the body

Glyphosate Detox

- Test!
- Sauna
- Glycine
- Humic acid
- Spirulina



"A word of advice, Durk: It's the Mesolithic. We've domesticated the dog, we're using stone tools, and no one's naked anymore."

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