UBIQUITINATION 19: THE WORLD OF LIGHT AND NAD+

READERS SUMMARY:

IS NITROGEN SUNLIGHT'S BRAKE?

HOW DOES PORPHYRINS SLOW DOWN LIGHT TO MAKE ENERGY USABLE TO LIFE?

IS SURFACE CHEMISTRY MORE IMPORTANT THAN BIOCHEMISTRY WITHIN A CELL?

WHAT IS A FLUOROPHORE OR A CHROMOPHORE AND HOW DO THEY USE LIGHT?

WHY DOESN'T VITAMIN D3 HAVE NITROGEN IN ITS MOLECULAR STRUCTURE?

On Earth most of our atmosphere is made up of nitrogen. 78% of it, to be exact. It turns out that sunlight's interaction with this massive amount of nitrogen surrounding us constantly is the first step in how life below is able to harness the sun's energy to make it usable for life. When sunlight first hits nitrogen high up in the atmosphere it generates an air-fluorescence radiation. Fluorescence is the emission of light or electrons by a substance that has absorbed light or other electromagnetic radiation. Sunlight makes nitrogen emit radiation in the UV range. Air-fluorescent radiation is capable of generating secondary electrons from this initial interaction. These interactions are very difficult to control, as most particle physicists can attest too. Most of these emitted electrons from nitrogen within our magnetosphere are low energy electrons ≳1 keV. The magnetosphere block most of

the higher energy photons or electrons from the sun. Life has figured out how to collect these lower energy electrons emitted from sunlight and nitrogen in air by capturing them using a specific protein called porphyrin. Porphyrin is a very flat molecule with a donut hole in its center. Porphyrin has a very specific ability. It absorbs all frequencies of UV light. Within porphyrin's donut shaped hole sits four nitrogen atoms located at the 10 o'clock, 2 o'clock, 4 o'clock, and 8 o'clock positions. The hole is 0.2nm large which is just big enough to hold specific metal ions.
These nitrogen atoms are what make porphyrin so important for life. Chlorophyll (Mg porphyrin) and hemoglobin (iron porphyrin) both contain the porphyrin ring as part of the substructure. This allows plants and animals to change sunlight into energy formulations that they can use respectively to make chemical energy. Porphyrins absorb light energy intensively in the UV region, and to a lesser extent in the long visible bands, resulting in transitions to excited electronic states.

It turns out nitrogen within porphyrins have the same amazing photoelectric abilities of nitrogen as we see in our atmosphere when the electromagnetic radiations are of the low energy variety. This dialed down power is what occurs in our atmosphere. These tertiary bio-photon releases have massive biologic significance, yet most in biology, have no idea why. Electrons passing through the atmosphere lose energy by inelastic collision with air molecules filled with 78% nitrogen. A small fraction of the deposited energy into these atmospheric nitrogen atoms is re-emitted as UV fluorescence radiation in the spectral range 290–430 nm. Since porphyrins all absorb radiation in the UV range, it begins to make sense why the porphyrin ring of chlorophyll and hemoglobin both contain 4 atoms of nitrogen. This is another step in lowering the UV light fluorescence to an even lower power in the ELF-UV range that cells can use to signal. It has been shown in the literature that all cells release UV light in the extreme low

frequency range. The fact that both chlorophyll and hemoglobin both contain this step down of power mechanism within them begins to explain how both function critically in bio-energy transfers from sunlight to water in plants and animals.

EARTH'S ATMOSPHERE BRAKE FOR LIGHT

Measurements of the air-fluorescence yield have been carried out for many years in science. Unfortunately, the accuracy of these studies is not enough for a precise calibration of fluorescence. This is especially true in telescopes at present. The reason for this is that many of the emitted UV photons are too high energy. No one in physics can find a good substance to do this job. ***Biology created porphyrin proteins to do this.*** Proteins are not suitable for higher energy electrons because anything above the microwave range does not work well with proteins in living things. In order to improve the accuracy in the fluorescence yield in astrophysics, several groups have been carrying out laboratory measurements to solve this problem. Usually the experimental set-up consists of a beam of electrons that collides with an air target at known conditions, controlling for temperature, pressure, humidity. Controlling these three variables is also critical for living things. This control allows physicists to generate fluorescence radiation that is then measured with an appropriate detection system. Life has figured out how to control these processes by altering the surface chemistry of leaves and the skin in plants and animals respectively, to complete this task.

In today's medical environment, my perspective on science is alien to most, but the reasons supporting my current stance is 100% native and natural to Earth's ecosystem and humans in their native form. This fundamental viewpoint offends their modern beliefs. Life is not an absence of action; rather it is buried in "timing and direction" of how light interacts with nitrogen; it must wait for just the right time to act, and requires the flow of it from outside to inside based upon for

the right physical principles, to develop in the ecosystem, and in the right way to become alive. **With time, I believe, it will be proven surface chemistry of the skin, eye, and gut is more important than biochemistry for humans.** *The interaction of light and nitrogen at surfaces is fundamental to my core belief today.*

A fluorophore (or fluorochrome, similarly to a chromophore) is a fluorescent chemical compound that can re-emit light upon light excitation. Fluorophores have particular importance in the field of biochemistry and protein studies. We use them in immunofluorescence studies. Fluorophores typically contain several combined aromatic groups, or plane or cyclic molecules with several π bonds. To understand them you need to know a bit of physics surrounding the photoelectric effect. The fluorophore absorbs light energy of a specific wavelength and re-emits light at a longer wavelength. The absorbed wavelengths, energy transfer efficiency, and time before emission depend on both the fluorophore structure and its chemical environment, as the molecule in its excited state interacts with surrounding molecules. Did you know that NADH in cytochrome 1 is a fluorophore? Did you know cytochrome two is filled with flavin proteins that are called chromophores? Why does this matter? Some proteins and small molecules in cells are naturally fluoresce, which is called intrinsic fluorescence or autofluorescence. What are some examples found in our cells? NADH, tryptophan hemoglobin, chlorophyll, phycoerythrin or green fluorescent protein are some. All cells are made have extracellular matrix, and in them, act as the core of their tensegrity system. The extracellular matrix can also contribute to autofluorescence because of the intrinsic properties of collagen and elastin. Things made from these things also possess properties that emit light when they interact with light. All cells release ELF-UV light. The color of the light that proteins release becomes critical in

understanding their physiologic abilities. These proteins are also associated with other proteins that act as detectors of the light emissions. They must be coupled precisely on a quantum basis by photons to get accurate signaling.

For example NADH in emits a photon of a specific light frequency (color) that interacts with flavin proteins because they respond exactly to the photoelectric energy contained within the biophoton released. A fluorophore, in analogy to a chromophore, is a component of a molecule which causes a molecule to fluoresce. It has a functional group which absorb energy of a specific wavelength and re-emits energy at a different but equally specific wavelength. The amount and wavelength emitted depend on both the fluorophore and the chemical environment of the fluorophore.
The best studied fluorophores in biology are nicotinamide adenine dinucleotides (NAD^+/NADH). These proteins are small and all made out of nitrogen atoms. As I discussed in detail in Ubiquitination 17, NAD^+ and sirtuins are designed to work together as a redox couple as well to create the eye's clock timing mechanism.

Did you remember that I told you that Vitamin D3 is a vitamin that does not have nitrogen in it? Have you ever wondered why that is the case? It turns out Vitamin D can't have nitrogen within its atomic structure because of the quantum physics buried within the creation of the molecule from the sun's photoelectric effect. This queerness is tied to how it is made from sulfated cholesterol from UVB solar light. The only difference between sulfated cholesterol and Vitamin D in our skin is a single double bond in the second ring of the cholesterol backbone of cholesterol. This gives Vitamin D one less hydrogen atom than the closed second cyclohexane ring (B ring) of cholesterol.

SPECIFIC SUNLIGHT

7-Dehydrocholesterol undergoes an electrocyclic reaction as a result of UVB radiation, resulting in the opening of the vitamin precursor B-ring through a conrotatory pathway. That simple molecular change alters its ability to fluoresce when sunlight is absorbed. That one 7-Dehydrocholesterol is the semiconductor in skin that takes specific solar frequencies of light and changes it to a chemically to a sulfated version of Vitamin D3. If nitrogen was present in this photocatalytic transformation it would alter the frequencies of light and Vitamin D3 (cholecalciferol) could not be made. This is because of the 7-Dehydrocholesterol absorbs UV light most effectively at wavelengths between 290-320 nm. The production of vitamin D3 will only occur at those wavelengths. 7-Dehydrocholesterol is a precursor steroid of Vitamin D3. All steroids have been used with great success as photo-compounds because when they are mixed with nitrogen, they form diazo or azide chemical groups. Diazo and azide chemicals contain nitrogen. This is why I have told many people that hormone levels and panels are a reflection of the cells reaction to their environment. **How light interacts with nitrogen is how I decipher those panels.** Those groups ***alter the compounds intrinsic photoactivity***. If nitrogen was in the atomic structure of Vitamin D3's synthetic steps, it would interact with sunlight in a non-quantized fashion and not be able to function as it does. This is why nitrogen cannot be in vitamin D3 pathways. The reason is optical and is quantized to energy.

Recall from the first paragraph that sunlight has to traverse the atmosphere to get to life and the Earth's atmosphere is filled with 78% nitrogen. Nitrogen is capable of interacting with very powerful energies that are found outside our magnetosphere and within it to change the frequency and power of these energies for other uses. Within our magnetosphere, nitrogen interacts with sunlight in our atmosphere. Molecular

processes are involved in the generation of air fluorescence between solar radiations and nitrogen in the atmosphere that mandate that Vitamin D3 can not have nitrogen in it. Cholecalciferol fluoresces at 380-460 nm frequencies because the B ring is opened.

This turns out this frequency is in the blue range of sunlight’s spectrum. This is very rare occurence in nature. Why is the color blue so rare in nature? The energy of physics is the answer. *It is mainly through energetic considerations:* as light becomes bluer, the energy of its constituent photons increases, and the number of materials (proteins) which can be excited to a high energy state and usefully convert that energy to light diminishes rapidly. It turns out your eye clock, retina, and respiratory proteins all use proteins containing these rare blue pigments in their molecular structures as you will soon see.

CITES:

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