

From: "jeffrey E." <jeevacation@gmail.com>
To: Ed Boyden <[REDACTED]>
Subject: Re: Plants
Date: Mon, 24 Apr 2017 12:14:20 +0000

glad to help. I think we might want to inquire re the similarities of plants and animals. . stressors , disease. energy. . fun. why do people and trees first get taller than wider . i get it for plants.

On Mon, Apr 24, 2017 at 8:01 AM, Ed Boyden, [REDACTED] <[REDACTED]> wrote:

Thanks for the metformin reminder! So far my immediate family has avoided diabetes by diet choice, but for my other relatives, I'll let them know.

I agree that mapping out the ways plants communicate, would be fascinating. Perhaps we can write down the words and rules akin to a language.

Very interesting on the aluminum front. We need ways to see how different building blocks are processed, trafficked, etc. in the body. One hope I have for our project on the world's smallest mammal is that we can watch molecules and atoms throughout the entire "life cycle" of the processes of the body.

Ed

On Thu, Apr 20, 2017 at 6:23 AM, jeffrey E. <jeevacation@gmail.com> wrote:

>
> dont forget the metformin, for insulin resistance. it is supposedly
> a wonder drug.
>
> Not sure how to think about the neurobiology of plants. There is a robust
> bunch of literature on how plant cells are stressed, how they respond and
> how they build biological resilience along the way. Because they are sessile
> and can't just call their doc for a prescription, whatever they do has to be
> relatively simple and part of a very basic process that either displaces,
> overcomes, outdoes or modifies a stressor to make it manageable.
>
> Plants don't have nerves per se but they have cells that behave in a similar
> way for similar purposes as our nerves. Plants do use what we call
> neurotransmitters catecholamines like dopamine and norepi- they have
> tons of acetylcholine and the same degradation pathways, and even the same
> glutamate pathways and receptors humans do. And, more.
>
> Classes of movements are common to almost all plants, just as with humans.
> Darwin described them pretty well. Breakdown in these movement systems can
> look similar in humans - we just have more types of motion to deal with than
> plants ... like when we get dopamine deficient in Parkinson or atrophied
> alpha motor neurons in ALS. They have similar problems in their motor
> systems, and usually they overcome them if they can adapt to or beat the
> stressor.
>

- > Plants also have memory (used mostly for growth and reproduction) and some
- > think different types of cognition too. While glutamate is a big player in
- > that process, it isn't the only one. Some of the chemicals have also evolved
- > to serve similar functions, including a lot of similarity in core function
- > between chlorophyll and melanin. Chlorophyll serves to capture light and
- > create energy, the core function require to sustain a sessile plant. Melanin
- > becomes dopamine, which allows humans to move and somehow plays other more
- > important roles that we don't yet understand as the melanocytes are derived
- > from neural crest cells (high priced embryologic real estate...)
- >
- > Stressors to motor or cognitive processes include(there are more):
- >
- > Water
- > Sodium
- > Temperature
- > Heavy metals
- > Pathogens (bugs)
- >
- > Also, light is very toxic to roots and certain type of internal cells in
- > vascular plants.
- >
- > So can plants get Alzheimer-like protein aggregation diseases that slowly
- > disrupt cognitive function to the point of death?
- > Can they get disordered movement disorders like Parkinson where they lack a
- > particular chemical or wasting diseases like ALS where their locomotion
- > capacity is slowly diminished.
- >
- > Yes, they do. And many more diseases too.
- >
- > In the case of acidified soil, aluminum (normally not particularly
- > bothersome unless in super high concentration) acts as a stressor in a very
- > similar way to what we see in alzheimer pathology. Using metabolic pathways,
- > root absorption of other elements, or even transfer of nutrients from root
- > symbionts, plant cells that are not consumed by the stress can manage, adapt
- > or clear the stressor. The pathology in a very specific part of the root
- > appears very similar to plaques/tangles, as does the resulting behavior in
- > plants.
- >
- > In humans, there is no viable use for aluminum and toxicity has long been
- > known. It is unlikely there is much concern on an environmental basis, but
- > maybe. I think there is probably enough silica . silicates in our water to
- > balance in out. But on a tiny scale, focused hits of aluminum can be very
- > deadly and especially when they are in an acidic environment.
- >
- > Recently, a common type of drug (PPI / proton pump inhibitor) taken for
- > heartburn, acid reflux or peptic ulcers was correlated w Alzheimer (Sample
- > from 74,000 people over age 75 from 2004-2011 in Germany). Specifically,
- > patients on PPI are thought to have a 44% increased risk of dementia. But in
- > my view the mechanism doesn't quite make sense - what does make sense is
- > that patients with heartburn reflux or ulcers also take antacids. And the
- > most common ingredient in antacids is aluminum. Not just regular aluminum
- > but straight to the most acidified part of the human body, so that the
- > aluminum becomes quite reactive. Some of the aluminum will be uptaken by the
- > bidirectional parasympathetics (vagal) and transported into the nervous

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