Prelim Bits 04-06-2017

How do plants react and adjust to drought mediated stress?

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- **Drought resistance** (DR) is one aspect in which enables plants to escape, avoid and tolerate drought stress.
- The second is by regulating the action of the hormones present in the plant, in particular, one called **abscisic acid (or ABA).**
- During drought stress, ABA moves from the roots to the leaves, helping them close the stomata in them, which allow for the entry and exit of gases (CO_2, oxygen, water vapour), and reduce plant growth.
- Other signalling molecules called **cytokinins** in the plant cells also act up, delaying premature leaf ageing and death.
- The third is to **control transpiration** (water release from the plant to the air) by closing the stomata, reducing water loss and reducing CO_2 uptake.
- The fourth way is to change the growth, size, shape and branching out of the roots.
- The fifth is through what is termed **osmotic adjustment.** Here the pressure exerted by the contents of the cell against the cell wall or membrane is maintained sufficiently tense for stiffness (and no collapse or breakdown). Botanists call this **turgor (swelling)**.
- Clearly, these five processes must be controlled and triggered by genes. Two molecules called **BES1 and RD26** - play key roles in regulating plant growth under drought conditions.
- BES1 is involved in the process by which certain plant steroids regulate plant growth. RD26 is active only when the plant experiences drought stress (Frenemies - characteristics of friends as well as enemies).

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NASA Missions

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- **NICER:** NASA will launch the world's first mission devoted to studying rapdily spinning **neutron stars.**
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- The agency plans to launch the two-in-one **Neutron Star Interior Composition Explorer,** or NICER, aboard SpaceX CRS-11, a cargo resupply mission to the International Space Station to be launched aboard a Falcon 9 rocket.
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- Neutron stars are the **remnants of massive stars** that, after exhausting their nuclear fuel, exploded and collapsed into super-dense spheres about the size of New York City.
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- Although neutron stars **emit radiation across the spectrum,** observing them in the energetic X-ray band offers the greatest insights into their structure and the high-energy phenomena that they host, including starquakes, thermonuclear explosions, and the most powerful magnetic fields known in the cosmos.
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- **Sounding Rocket:** NASA is set to launch a sounding rocket which will **release blue-green and red artificial clouds.**
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- The Terrier-Improved Malemute sounding rocket will test a new deployment system that will support space studies.
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- Sounding rockets take their name from the nautical term "to sound," which means to take measurements. **The flight of a sounding rocket is short-lived, and has a parabolic trajectory**.
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