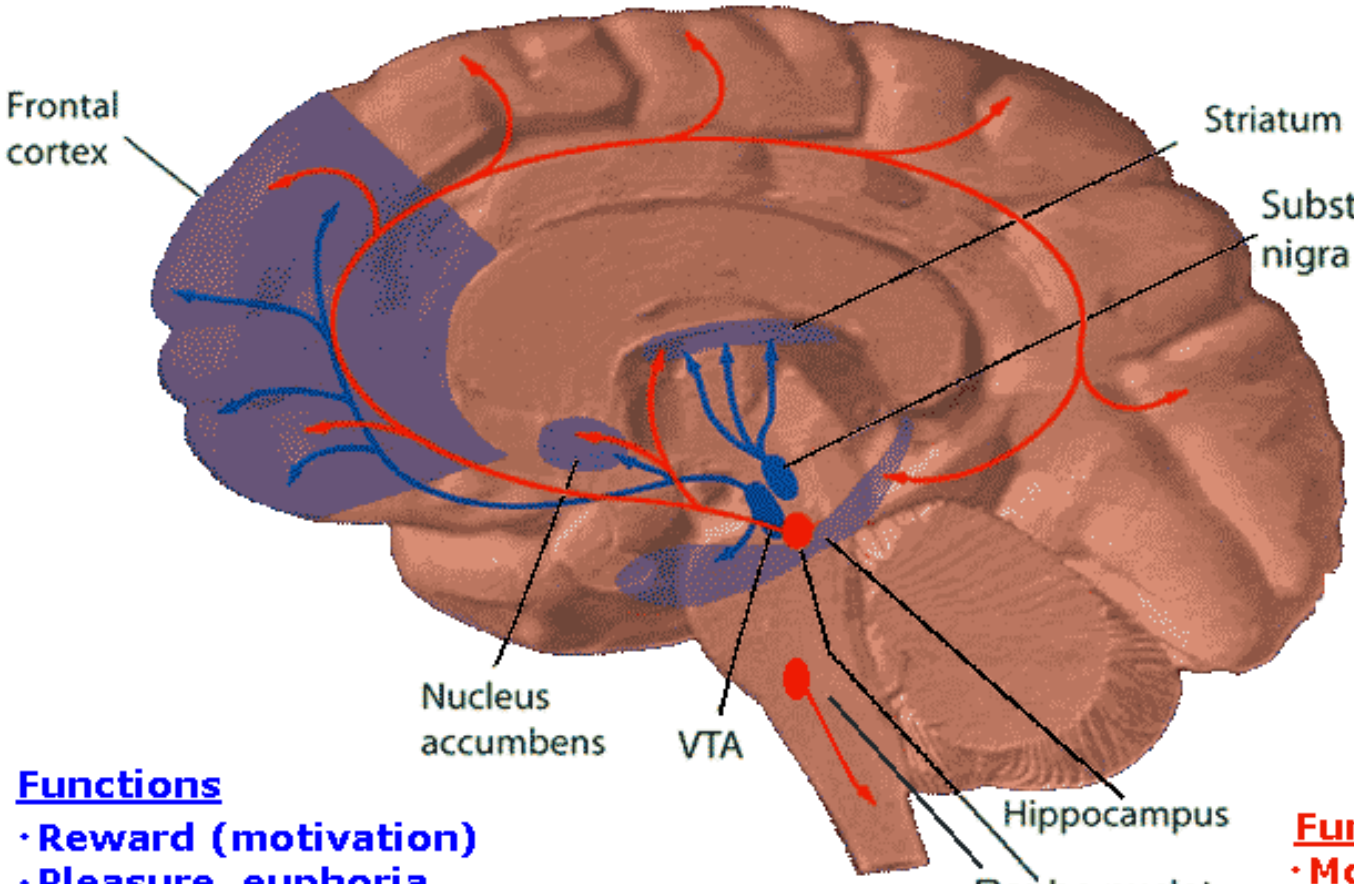
Week 2: What Motivates You?

Dr. Terrence Sejnowski

Dopamine Pathways

Serotonin Pathways

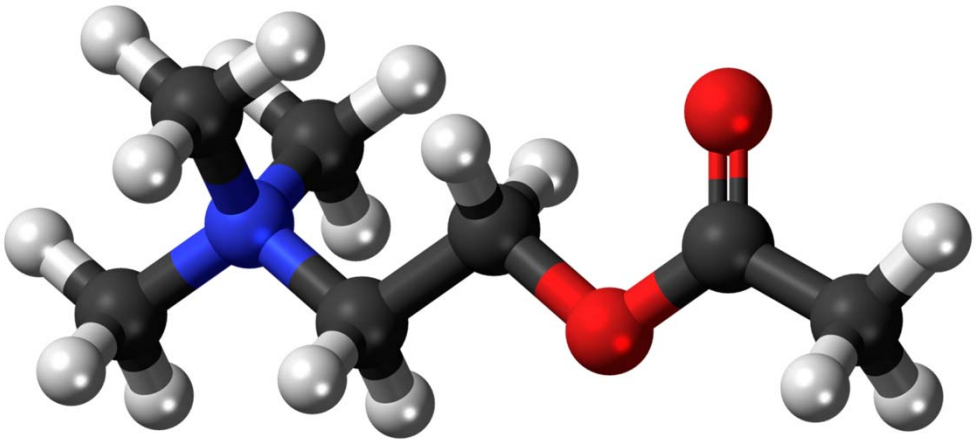


Functions

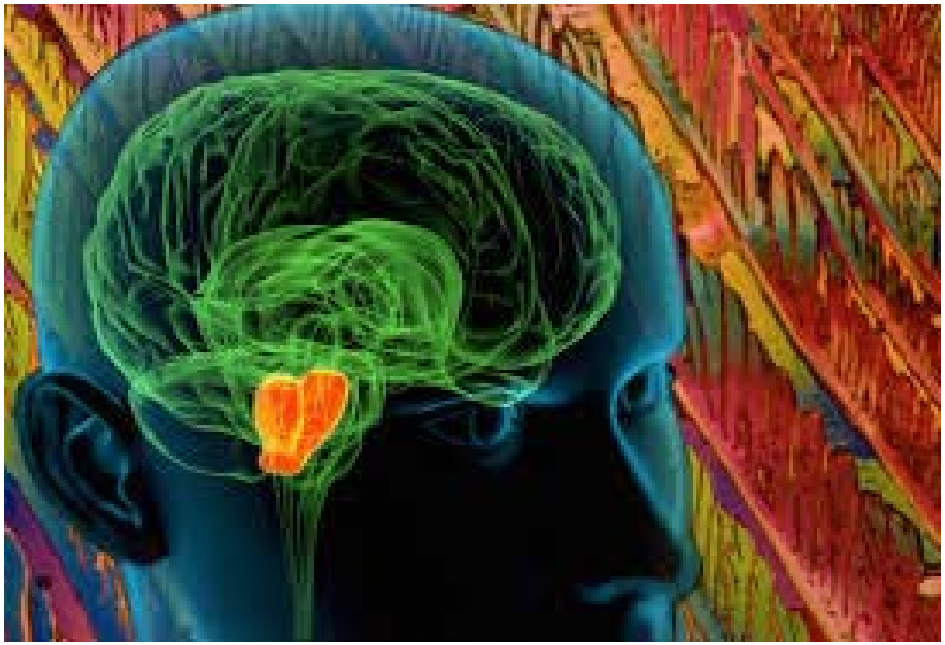
- Reward (motivation)
- Pleasure, euphoria
- Motor function (fine tuning)
- Compulsion
- Perseveration

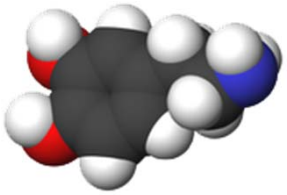
Functions

- Mood
- Memory processing
- Sleep
- Cognition

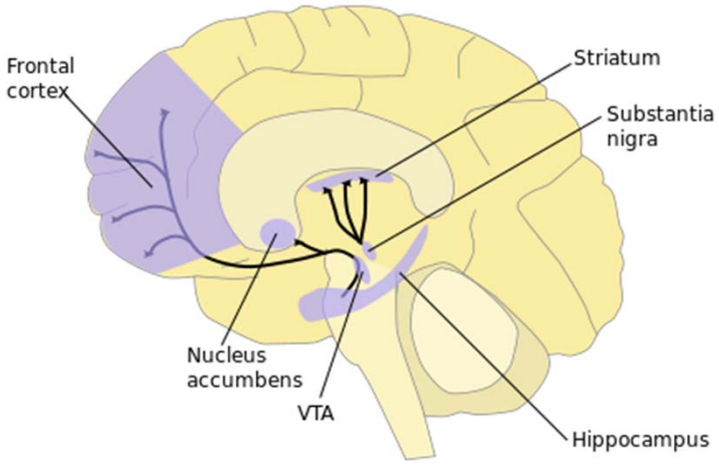


Acetylcholine, a chemical produced by acetylcholine neurons

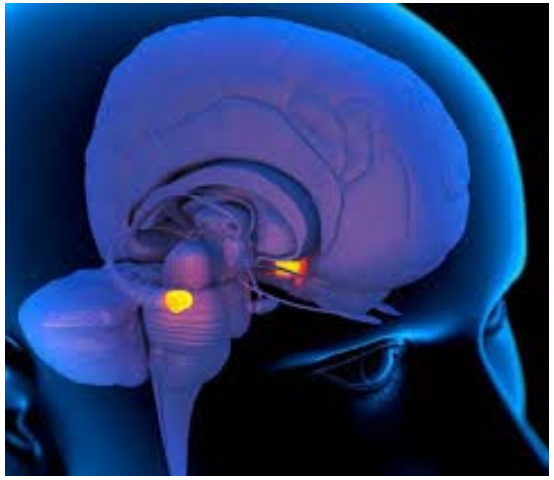


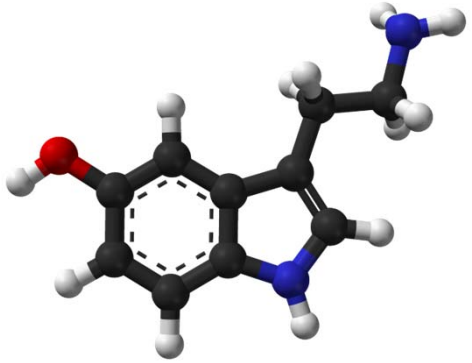


Dopamine molecule



Dopamine signaling pathways





Serotonin molecule

Relevant Readings

- Inda MC, Muravieva EV, Alberini CM. "Memory retrieval and the passage of time: from reconsolidation and strengthening to extinction." *Journal of Neuroscience* 2011 Feb 2; 31(5):1635-43. PMID: 21289172.
- Han X, Chen M, Wang F, Windrem M, Wang S, Shanz S, Xu Q, Oberheim NA, Bekar L, Betstadt S, Silva AJ, Takano T, Goldman SA, Nedergaard M. "Forebrain engraftment by human glial progenitor cells enhances synaptic plasticity and learning in adult mice." *Cell Stem Cell*. 2013 Mar 7;12(3):342-53.
- www.brainfacts.org

Image Credits

- Dopamine and serotonin pathways, National Institutes of Health, http://en.wikipedia.org/wiki/File:Dopamineseratonin.png
- Ball-and-stick model of the acetylcholine cation, a neurotransmitter in many organisms including humans. The nitrogen atom has a positive charge. Black: Carbon, C; White: Hydrogen, H ; Red: Oxygen, O ; Blue: Nitrogen, N; Work produced by Jynto. http://en.wikipedia.org/wiki/Acetylcholine#mediaviewer/File:Acetylcholine-cation-3D-balls.png
- Dopamine -3d-CPK, Sbrools, http://en.wikipedia.org/wiki/Dopamine#mediaviewer/File:Dopamine-3d-CPK.png
- Dopamine pathways, NIDA http://en.wikipedia.org/wiki/Dopamine#mediaviewer/File:Dopamine_pathways.svg
- Ball-and-stick model of the serotonin molecule, by Ben Mills, http://en.wikipedia.org/wiki/Seratonin#mediaviewer/File:Serotonin-Spartan-HF-based-on-xtal-3D-balls-web.png