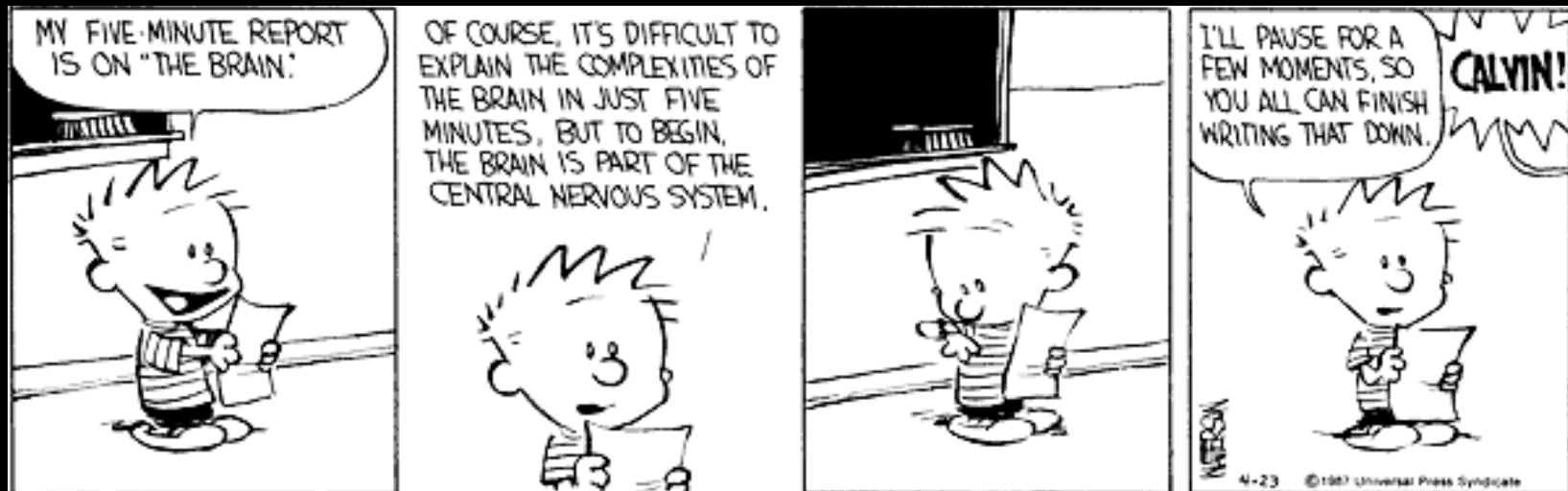


This is your brain!



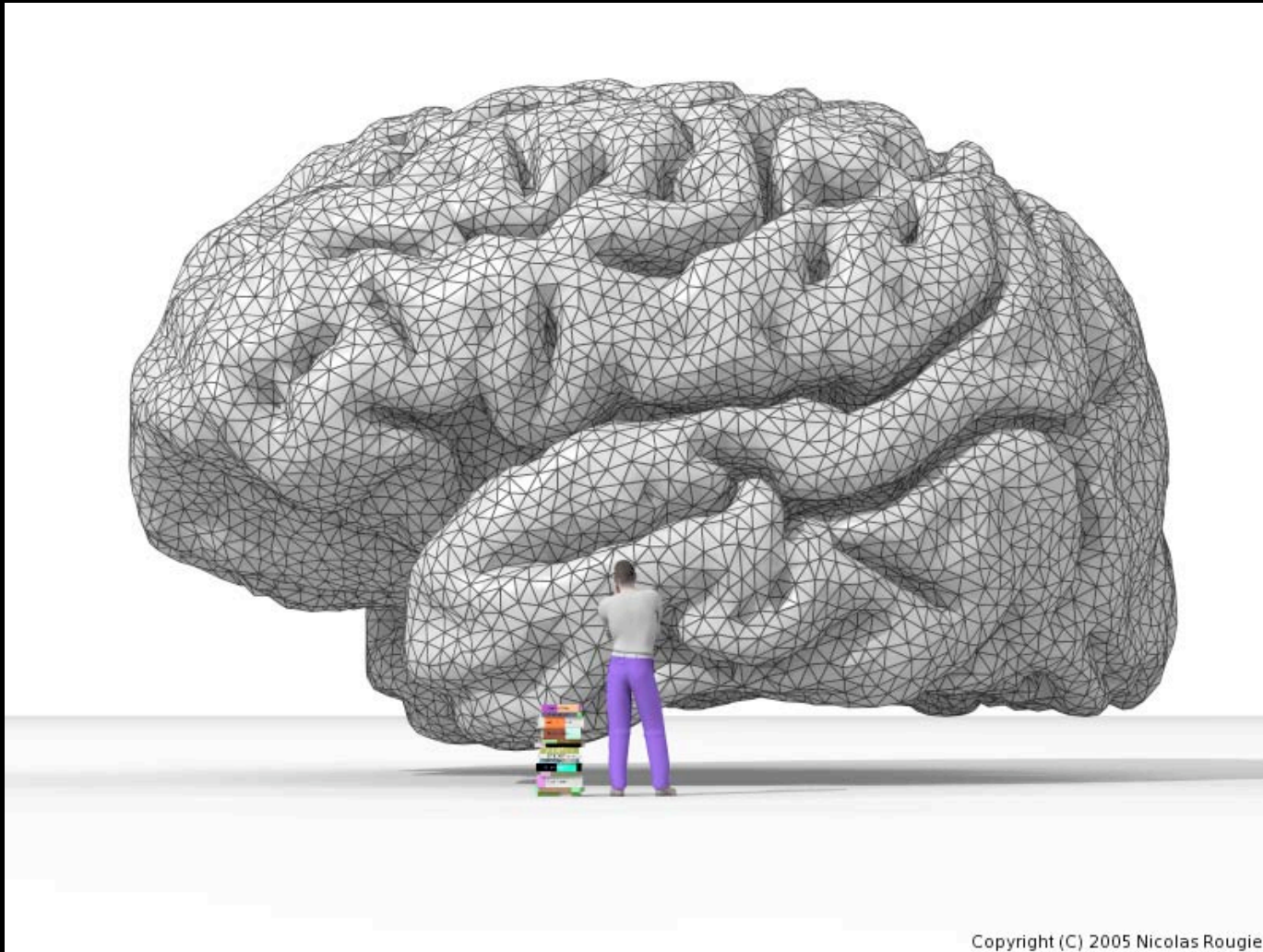
Splash!

October 18, 2008

What are we doing today?

- Who are we?
- Introducing your brain
- Cool things we like about the brain
 - Sensation
 - Memory
 - Attention
- Real brains!

Introducing Your Brain



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What does your brain do?

What can go wrong?

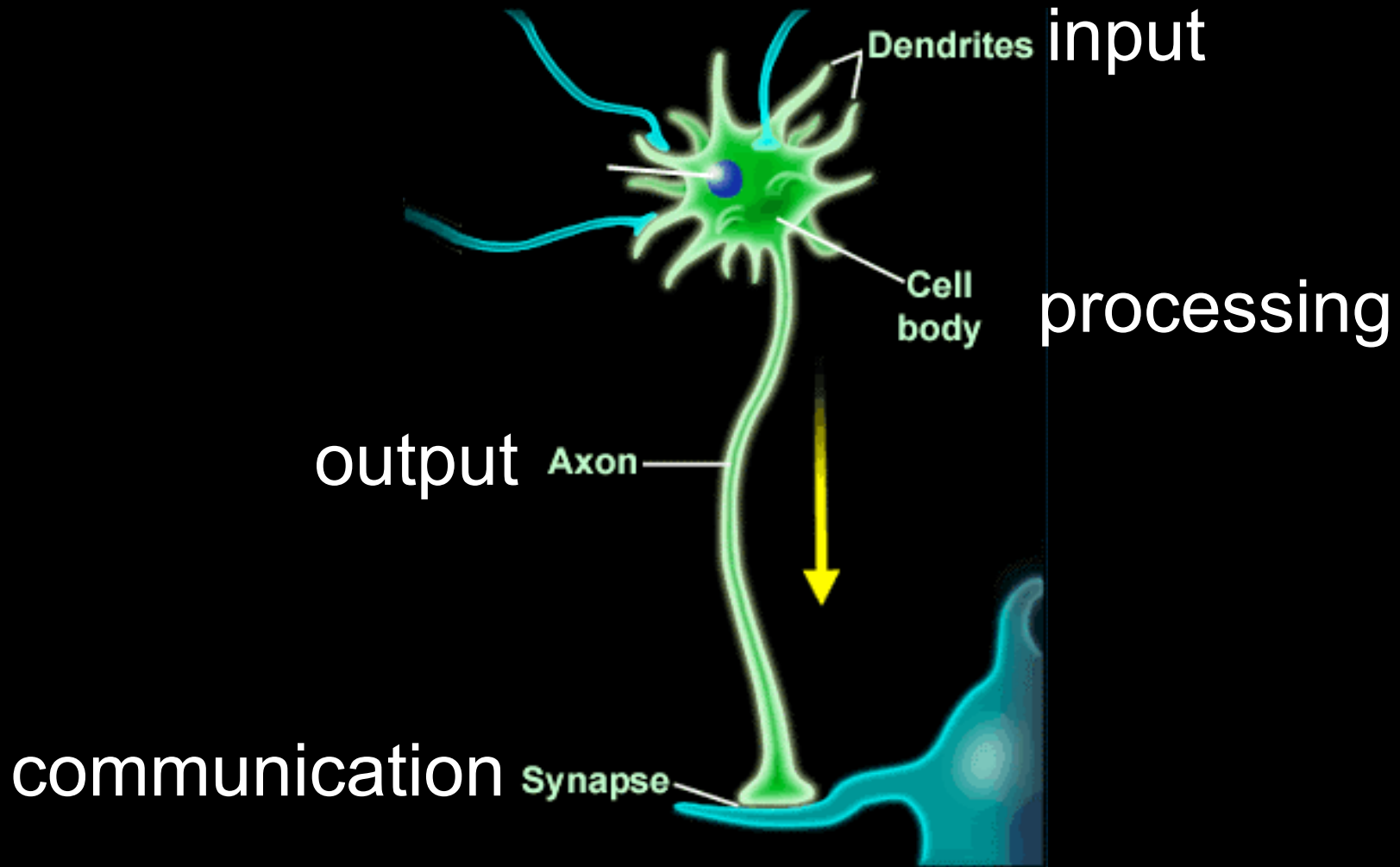
What's a Brain Made Of?

100 billion neurons!



Even MORE glia

The Neuron

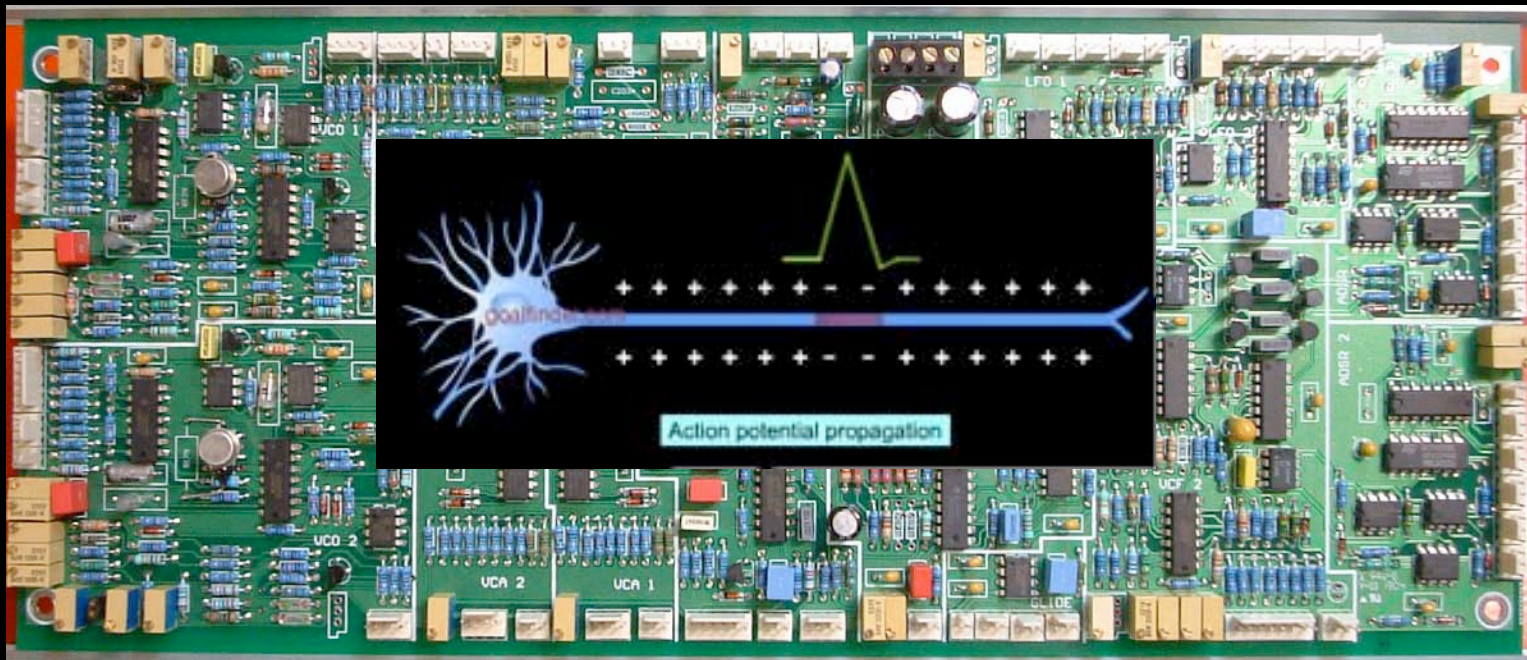


How Does the Brain Work?

1 quadrillion synapses!!



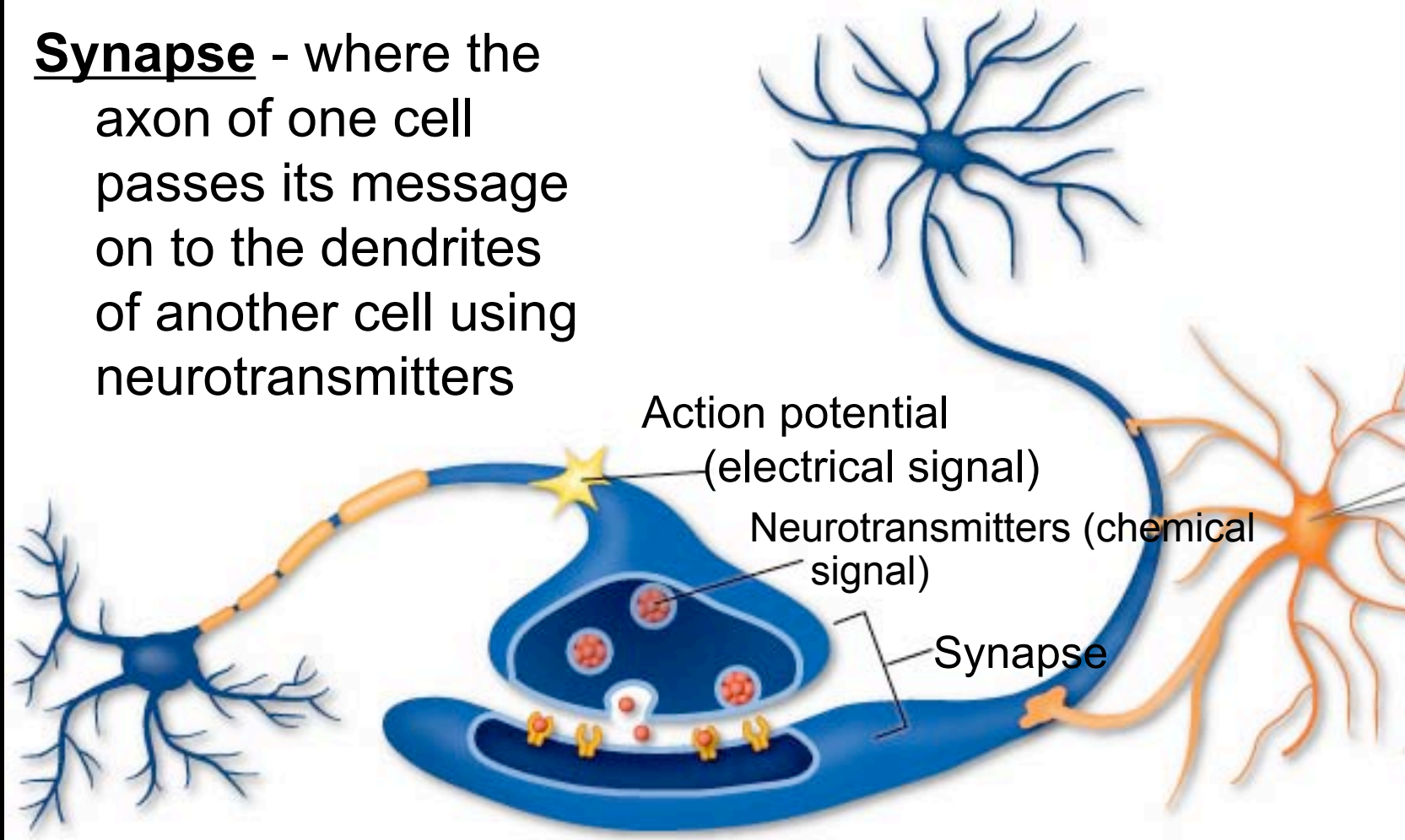
Electrical Signals: Digital



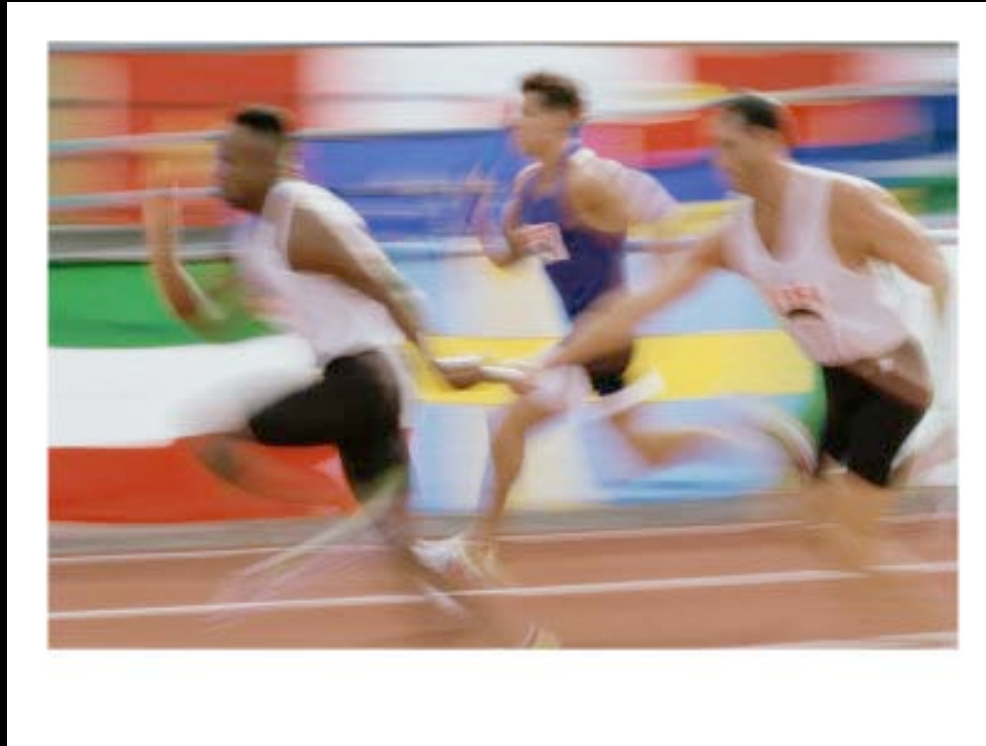
The Action Potential - how a message gets passed *inside a cell* from the dendrites to the axon; all or nothing - there either IS a message or there IS NOT

Chemical Signals: Analog

Synapse - where the axon of one cell passes its message on to the dendrites of another cell using neurotransmitters

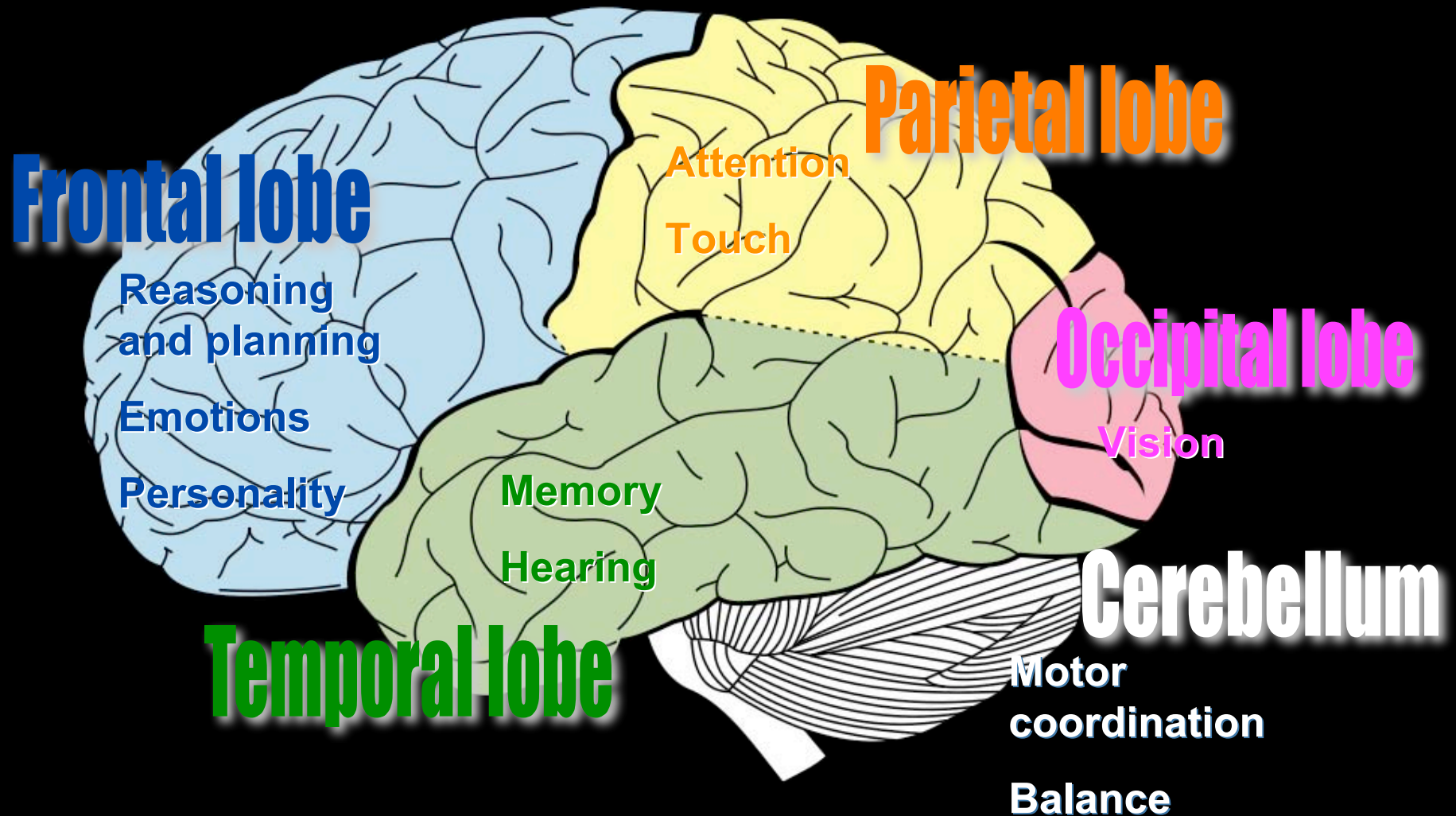


From Sensation to Action



Your nervous system is like a relay race - passing on messages from one neuron to another, going from sensation to action

Your Brain is Specialized



On to other cool brain things!

- Sensation
 - The Homunculus (little man) in your brain
 - 2-point discrimination: where can you most easily feel 2 different points
 - Blind Spots: the hole in your eye
 - Knee-jerk reflex

On to other cool brain things!

- Memory
 - Declarative memory and the hippocampus
 - H.M. - the man who couldn't make new memories because both of his hippocampi were removed
 - Non-declarative/implicit memory and the cerebellum
 - Learning to touch a point with prisms on - fast adjustments to figure out how to coordinate your arm muscles to reach the target when your vision and your arm signals conflict

On to other cool brain things!

- Attention and Consciousness
 - Top-down attention
 - The parietal and frontal lobes telling your basic senses (eyes & ears) what to pay attention to
 - Bottom-up attention
 - Information being presented to and capturing your senses (e.g. hawk's shadow over chick)
 - Missing the obvious and change blindness
 - <http://viscog.beckman.uiuc.edu/grafs/demos/15.html>
 - Spot the difference pictures
 - The Stroop Effect
 - Trying to stop automatic things your brain does (like reading) when you are told to pay attention to something else (like the color of the letters) - very difficult when they conflict