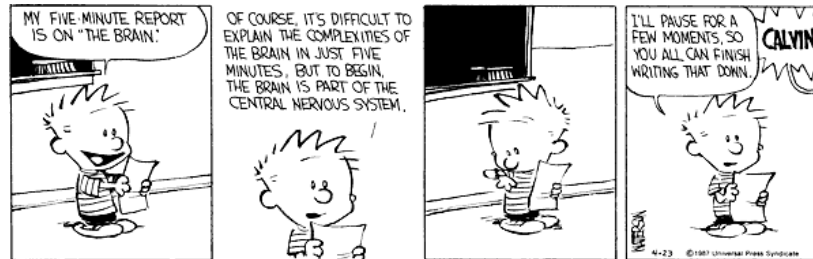


# This is your brain!

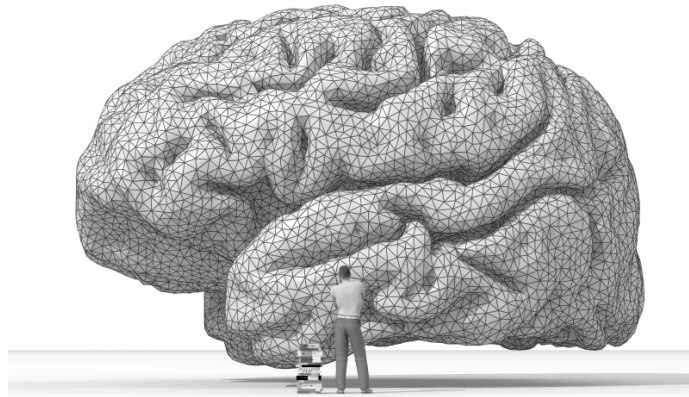


Splash!  
October 18, 2008

## 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



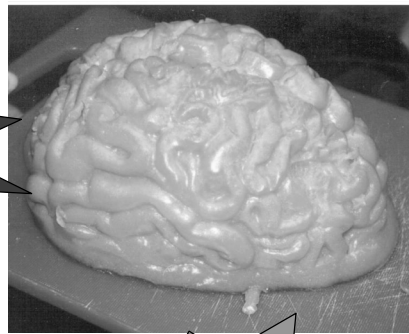
Copyright (C) 2005 Nicolas Rougier

What does your brain do?

What can go wrong?

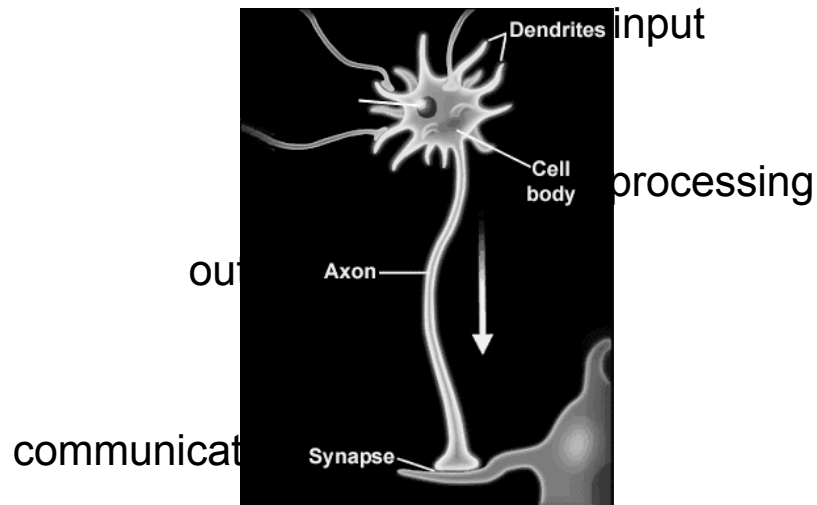
What's a Brain Made Of?

**100 billion neurons!**

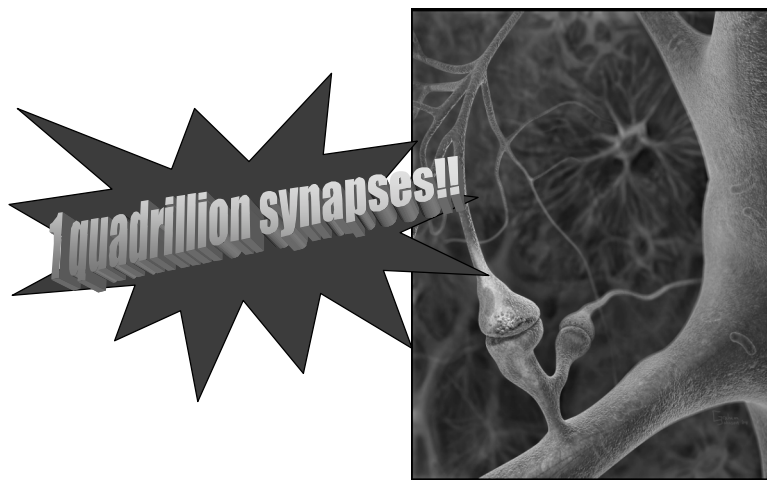


**Even MORE glia**

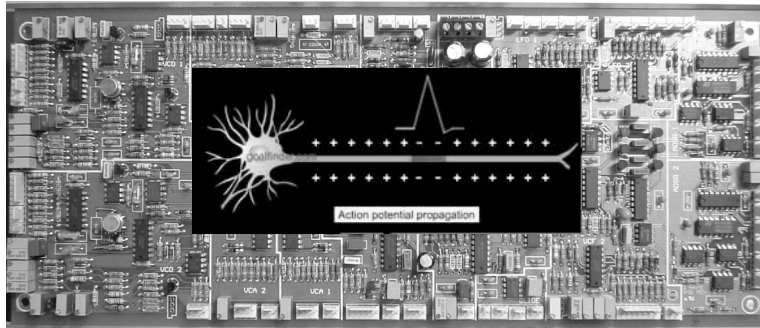
# The Neuron



# How Does the Brain Work?



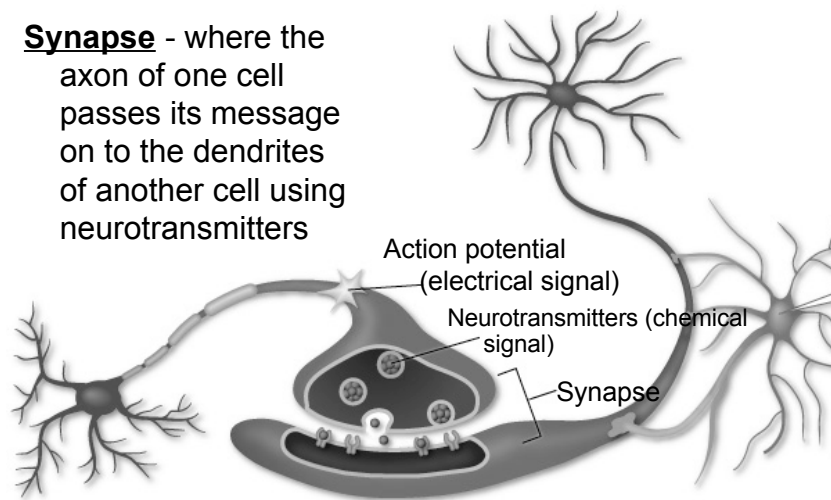
## Electrical Signals: Digital



**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

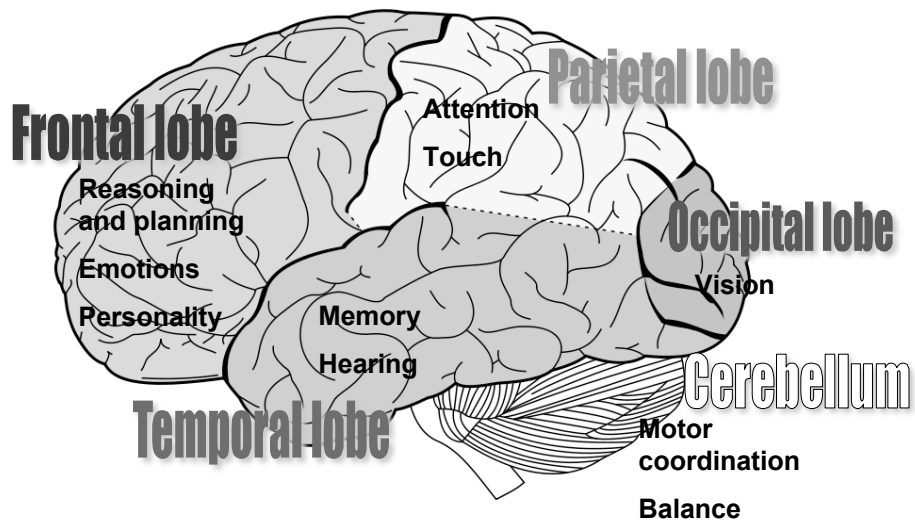


## From Sensation to Action



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