

# Brain Maps – The Sensory Homunculus

Our brains are maps. This mapping results from the way connections in the brain are ordered and arranged. The ordering of neural pathways between different parts of the brain and those going to and from our muscles and sensory organs produces specific patterns on the brain surface.

The patterns on the brain surface can be seen at various levels of organization. At the most general level, areas that control motor functions (muscle movement) map to the front-most areas of the cerebral cortex while areas that receive and process sensory information are more towards the back of the brain (Figure 1).

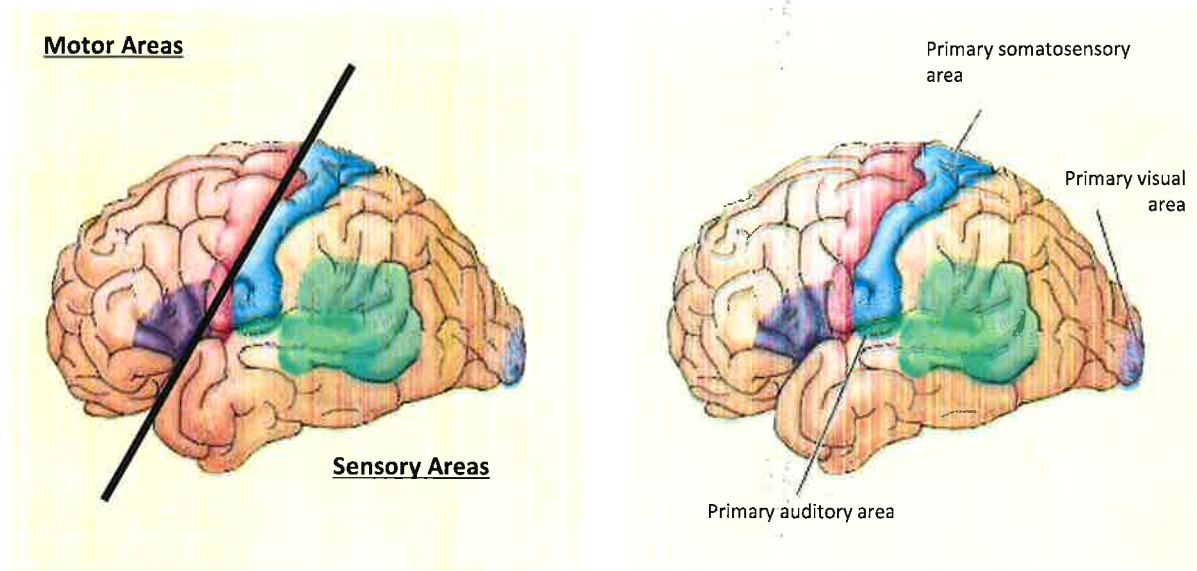
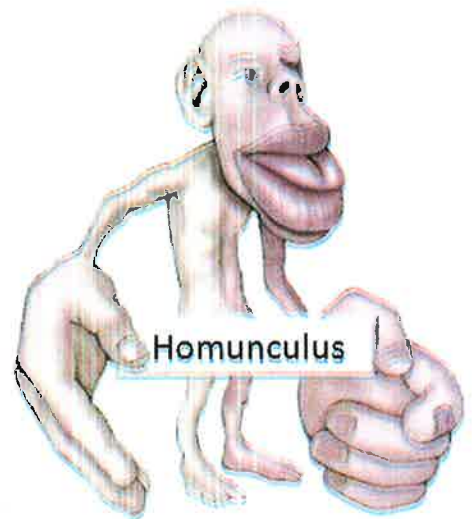


Figure 1. A diagram of the left side of the human cerebral cortex. The image on the left shows the major division between motor functions in the front part of the brain and sensory functions in the rear part of the brain. The image on the right further subdivides the sensory regions to show regions that receive input from somatosensory, auditory, and visual receptors.

We then can divide these general maps of motor and sensory areas into regions with more specific functions. For example, the part of the cerebral cortex that receives visual input from the retina is in the very back of the brain (occipital lobe), auditory information from the ears comes to the side of the brain (temporal lobe), and sensory information from the skin is sent to the top of the brain (parietal lobe).

But, we're not done mapping the brain. Each sensory area is divided even further into a more detailed map. Our visual field, the area we see in front of us, is mapped point by point onto the visual cortex (Figure 2). The notes of the musical scale are mapped across the auditory cortex (Figure 3). And, the sensory pathways from the skin, which give information on pain, temperature, and touch are mapped onto the somatosensory cortex (Figure 4). This mapping of our sense of touch onto the cortex gives us a representation of the body which was named the Homunculus by its discoverer, Wilder Penfield.