PLATE 1  A first approach to the anatomy of the brain. A. Always keep in mind how the brain is situated in the human head. It’s the first step in appreciating the spatial layout of the cortex, which is filled with some 85% white matter, the shielded ‘highways’ that link all the major regions to each other. Bottom right: The cortex is mounted on the brainstem and subcortex, which flows up from the spinal cord. The event-related EEG is a reminder that the young lady in A has a constant, dynamic flow of massive signal traffic flowing through her brain, which we can pick up with surface EEG.

PLATE 2  Use the human head (upper left) to stay oriented. We can see the corpus callosum from the left side. The brain has three major planes of section to keep in mind.

PLATE 3  The specialized regions of the cortex, the huge covering of the brain. Cortex is a flat sheet that is folded into the upper cranium. Notice the colored regions – the major functions of the cortex. It is the cortex that is believed to support the specific contents of conscious experiences. Its posterior half is sensory, its front half is motor and ‘future directed’ – cognition, working memory, planning, decision-making.

PLATE 4  Neurons pervade the body, and the spinal cord is a great highway channel between the brain and the rest of the body. Left, we see the brain from a left medial perspective. Notice the canonical directions, which are like North, South, East and West in geography. The simplest terms are given on top (Up, Down, etc.). But anatomists always use the Latin-based words. Use this figure for reference if you need to understand a brain figure in the book.
PLATE 5  Again, begin with the human head, and notice how the two hippocampi are nestled inside of each of the two temporal lobes. A vertical slice from ear to ear (coronal) only shows the hippocampi as small circular disks (red). On the bottom, if you imagine craning the head backward, you can visualize the location of the medial temporal lobe (MTL) which contains the two hippocampi. Those structures are crucial for emotion, vision, and memory.

PLATE 6  Upper Left: The white matter tracts emerge in a great ‘fountain’ of fiber tracts from the thalamus. Other fiber tracts run in all the major directions. Below and to the right are tractographs, specialized MRI scans that show the massive highways between all major parts of the brain. Almost all are bi-directional. Source: Upper left, Izhikevich & Edelman, 2008; right side: Hefer & Frahm, 2006.

PLATE 7  The body and brain are highly interconnected. Upper left, we see how the medial view of the brain (facing right) is well-connected with endocrine system (hormonal) and immune regulation, and with autonomic regulation (heart, lungs, stomach, intestines, and blood vessels). Humans have no voluntary control over these functions, unlike our external muscles of the body and head. Source: Lane & Wager, 2009.

PLATE 8  A wider perspective. On the upper left, we see a person looking at a rotating visual disk, which triggers widespread brain activity, beginning in area V1 (dark blue). V1 is as big as a credit card, but it is folded inside the occipital lobe. Below, we see a comparison to a fruit fly brain, which has perhaps 100,000 neurons. A single neuron is shown to the right, followed by a single organic molecule, an amino acid (because of the amine fraction (NH₂), and a carboxyl fraction (COOH)). All the vertices in the diagram stand for carbon atoms. R refers to a side chain, which could be quite variable. All levels of analysis, from molecules to gross anatomy, are vitally important. All proteins and many neurotransmitters involve amino acids.