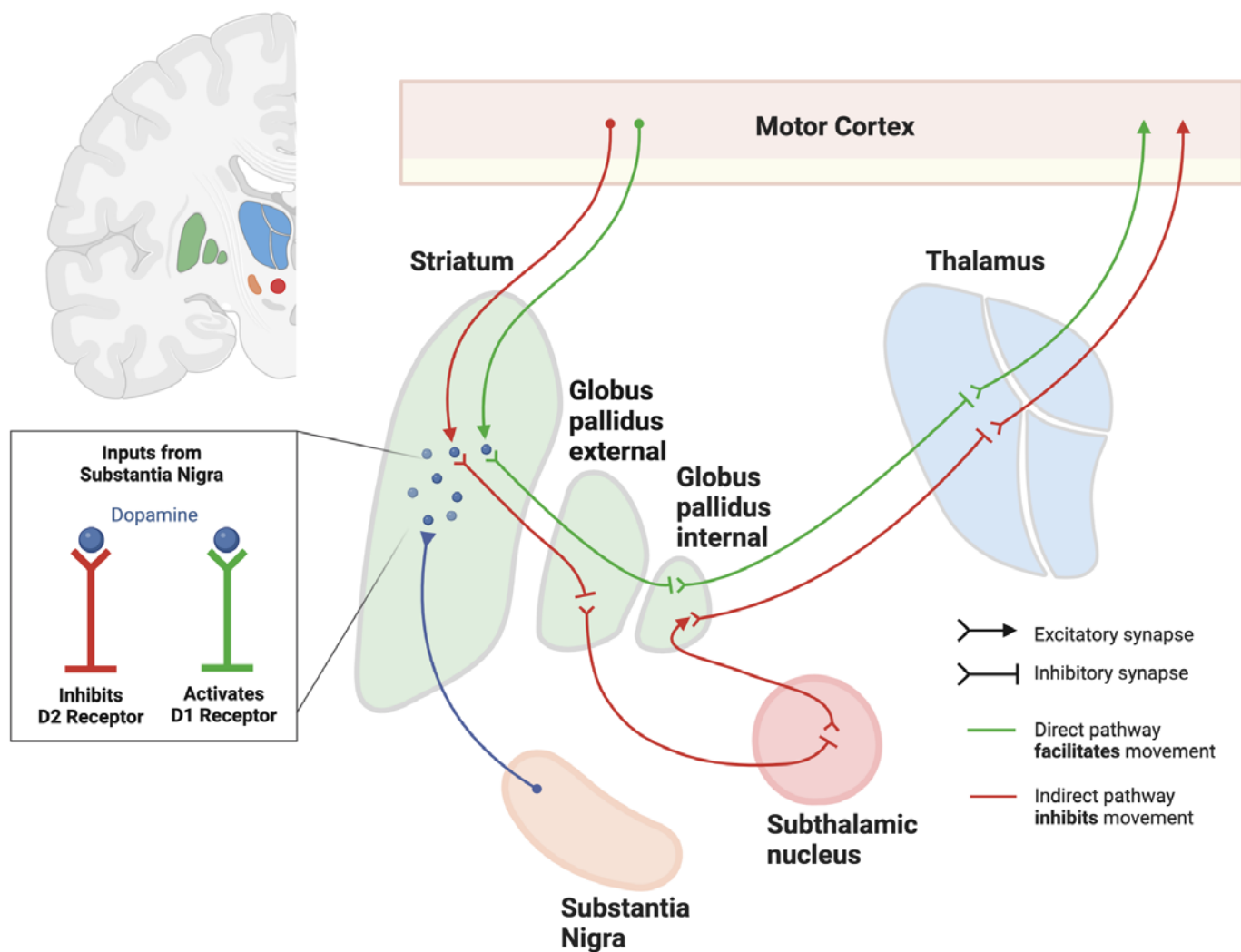


**FIGURE 71**

*The basal ganglia.*<sup>86</sup>

### The Circuitry of the Basal Ganglia

Exactly which nuclei are included in the collection of regions that are the basal ganglia can depend on whom you ask! Major elements include the striatum (which in primates is made up of the caudate and putamen), the globus pallidus (which has an internal and external section), and the subthalamic nucleus (found just underneath the thalamus, as its name suggests). Also included is the substantia nigra, a part of the midbrain in the brainstem, as it is a functional part of the main circuitry in the basal ganglia.

There are two major loops that can be taken through these regions to the thalamus and then back up to the motor cortex. The direct pathway facilitates movement, making it easier to get a movement started or to keep it going. Motor input from the cortex activates the striatum, which inhibits the inhibitory neuron in the globus pallidus, thus reducing inhibition on the thalamus (as two negatives make a positive), allowing more movement to occur.

The indirect pathway inhibits movement, making sure that there is no excess movement occurring that is not wanted. Motor input from the cortex activates the striatum, which inhibits a different portion of the globus pallidus, which then disinhibits the subthalamic nucleus, which disinhibits the other portion of the globus pallidus. In this way, there is a triple negative, resulting in an increased inhibition on the thalamus and a reduction in the amount of motor signal allowed back up to the motor cortex.