

Cerebrum

- ★ **Interneurons**: - present **only** **intracortical** (processes **don't** leave cortex)
 - **All** are **inhibitory** **except** (Excitatory Spiny Stellate cells)

Cells	Horizontal cells of Cajal (Retzius cajal cells)	Stellate cells (Granule cell)	Martinotti cells
Characteristics	<ul style="list-style-type: none"> * Few * Layer I (Molecular, Plexiform) * parallel to surface * development → Prominent * after birth → Disappear 	<ul style="list-style-type: none"> * most numerous * Layer II & IV (External granular & Internal granular) 	<ul style="list-style-type: none"> * deepest layer
Neurons	Spindle shaped	Multipolar triangular & dark condensed nuclei	Large Multipolar
Dendrites		Several	Very short & few
Axons	pass laterally to synapse with dendrites of Pyramidal cells		extend towards surface & bifurcate to run horizontally superficially forming synapse with Pyramidal cells

★ **Projection Neurons** : processes **leave** cortex

Cells	Pyramidal cells	Fusiform cells
Characteristics	* All layer except Layer I	
Neurons	Flask shaped or triangular	spindle shaped oriented at right angles to the cortex
Dendrites	* thick Apical → penetrate up to (Molecular layer) * multiple Basal → spread horizontally * numerous dendritic Spines	numerous branching into superficial layer
Axons	from base of soma penetrates deeper projecting to White Matter	One axon from lower part of soma projecting to White Matter

I + II + III → Supragranular layers

V + VI → Infragranular layers

Layer	Cells	Fibers	Characteristics
<p>Layer (I)</p> <p>(Molecular, Plexiform)</p>	<p>① few scattered horizontal cells of Cajal</p> <p>② some neuroglia</p>	<p>parallel nerve fibers from cells of other deeper layers</p>	<p>* most superficial</p> <p>* directly under Pia matter</p>
<p>Layer (II)</p> <p>(External Granular)</p>	<p>① Predominate Stellate (granule) cells: - spiny (excitatory) - smooth (inhibitory)</p> <p>② small Pyramidal cells projecting to deeper layers</p>	<p>① Dendrites of Stellate cells terminate in this layer or ascend into Molecular layer</p> <p>② Axons of Pyramidal cells projecting to internal layers</p>	
<p>Layer (III)</p> <p>(External Pyramidal)</p>	<p>① medium sized Pyramidal cells project to same & opposite hemispheres</p> <p>② Stellate cells</p> <p>③ Martinotti cells</p>	<p>Apical dendrites extend into Molecular layer</p>	<p>* pyramidal cells increasing in size deeper in this layer</p> <p>* cells project as: association & commissural fibers</p>

Layer	Cells	Fibers	Characteristics
Layer (IV) (Internal Granular)	① closely packed small Stellate cells (granule) ② neuroglia ③ outer band of baillarger or Stripe of Gennari		* greatest cell density of the cortex * Motor cortex (Agranular) few granule cells * Sensory, Somatic, Auditory cortex (granular) numerous granule cells
Layer (V) (Internal Pyramidal)	① Pyramidal cells ② neuroglia ③ Martinotti cells ④ inner band of baillarger ⑤ largest Betz cells project to superficial layer & subcortical centers		* Lowest cell density of the cortex * cells project as: corpus striatum, pons, brain stem nuclei, spinal cord
Layer (VI) (Polymorphic)	① Martinotti cells ② nerve cells of different shapes	many axons that enter or leave white matter	* deepest layer * close to White matter