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Neuroanatomy: Brain Structure & Function

Printable Flashcards — Pre-Med Biology

Cerebral lobes, motor and sensory cortex, Broca and Wernicke areas, limbic system, brainstem, and cerebellum.

165 cards — Print double-sided, flip on long edge, then cut along dashed lines.

165 cards — Printable Flashcards

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1

CNS vs PNS (one line each):

2

The brain is part of the CNS. True or false?

3

3 big brain regions pre-med loves:

4

Cerebrum does what (high-level)?

5

Brainstem does what (high-level)?

6

Cerebellum does what (high-level)?

7

Grey matter is mainly...

8

White matter is mainly...

2

True.

1

CNS = brain + spinal cord. PNS = nerves that connect CNS to the body.

4

Conscious thought, sensation, and voluntary movement.

3

Cerebrum, cerebellum, brainstem.

6

Coordinates movement and balance (smooths motion).

5

Runs vital automatic functions (breathing, heart rate) and links brain to spinal cord.

8

Myelinated axons (communication).

7

Neuron cell bodies + synapses (processing).

9

Cerebral cortex is...

10

Brain hemispheres: left and right. Do they each control the same side of the body?

11

If the LEFT motor cortex is damaged, which side of the body is weaker?

12

If the RIGHT somatosensory cortex is damaged, which side loses sensation more?

13

Why does the brain have folds (gyri and sulci)?

14

A gyrus is a...

15

A sulcus is a...

16

4 cerebral lobes (name them):

10

Mostly no. Each hemisphere mainly controls the opposite side.

9

The outer grey matter layer of the cerebrum.

12

The LEFT side.

11

The RIGHT side.

14

Ridge (a raised fold).

13

More surface area -> more cortex packed into the skull.

16

Frontal, parietal, temporal, occipital.

15

Groove (a valley between folds).

17

Occipital lobe is mainly for...

18

Temporal lobe is mainly for... (2 big things)

19

Parietal lobe is mainly for...

20

Frontal lobe is mainly for...

21

Central sulcus separates which two lobes?

22

Primary motor cortex is in which lobe?

23

Primary somatosensory cortex is in which lobe?

24

Precentral gyrus =

18

Hearing and memory (also language comprehension).

17

Vision.

20

Planning/decision-making and voluntary movement (plus speech production).

19

Body sensation + spatial awareness.

22

Frontal lobe.

21

Frontal (front) from parietal (back).

24

Primary motor cortex.

23

Parietal lobe.

25

Postcentral gyrus =

26

If you picked 'postcentral gyrus = motor', what did you mix up?

27

Motor homunculus idea (in one line):

28

Sensory homunculus: which body parts take more cortex space?

29

Frontal lobe damage often affects... (big 2)

30

Prefrontal cortex is mainly about...

31

Parietal lobe damage often affects...

32

Right parietal lobe damage can cause 'neglect' of...

26

Pre vs post. Precentral is motor; postcentral is sensory.

25

Primary somatosensory cortex.

28

Hands and face (high sensitivity).

27

Different body parts take different amounts of motor cortex space.

30

Planning, decision-making, attention, impulse control.

29

Planning/impulse control and voluntary movement.

32

The left side of space/body.

31

Touch processing and spatial awareness.

33

Occipital lobe damage tends to cause...

34

Temporal lobe damage can affect... (big 2)

35

In most people, language is mainly in the... hemisphere.

36

Broca's area does what?

37

Wernicke's area does what?

38

Broca's area is in which lobe (basic)?

39

Wernicke's area is mainly in which lobe (basic)?

40

Broca aphasia: what does it look like?

34

Hearing/language comprehension and memory.

33

Visual problems (like loss of visual field).

36

Speech production (forming words).

35

Left hemisphere.

38

Frontal lobe (usually left).

37

Language comprehension (understanding).

40

Hard to speak (slow, broken), but understanding is relatively okay.

39

Temporal lobe (usually left) near the temporal-parietal region.

41

Wernicke aphasia: what does it look like?

42

If a patient speaks fluently but can't understand you, suspect...

43

If a patient understands you but struggles to form words, suspect...

44

If you picked 'Broca = understanding', what did you mix up?

45

Conduction aphasia (harder): what's the key feature?

46

Why do most language deficits happen after LEFT hemisphere stroke?

47

Primary visual cortex is in the... lobe.

48

Primary auditory cortex is in the... lobe.

42

Wernicke's area.

41

Fluent speech but it doesn't make sense, and comprehension is poor.

44

Broca produces speech.
Wernicke understands language.

43

Broca's area.

46

Because language centers are usually left-dominant.

45

They can understand and speak, but repeating phrases is hard.

48

Temporal lobe.

47

Occipital lobe.

49

Most sensory info goes through the thalamus before cortex. What's the big exception?

50

If a question says 'sensory relay station to the cortex', answer is...

51

Thalamus is NOT mainly for... (trap)

52

Occipital lobe damage can cause vision loss even if the eyes are fine. Why?

53

Auditory cortex damage affects... (basic)

54

Corpus callosum does what?

55

Corpus callosum is mostly grey matter. True or false?

56

Left hemisphere is usually dominant for...

50

Thalamus.

49

Smell (olfaction).

52

Because the brain has to process the visual signal.

51

Long-term memory storage.

54

Connects the left and right cerebral hemispheres.

53

Processing of sound/hearing.

56

Language and analytic/step-by-step tasks (classic generalization).

55

False. It's white matter (axons).

57

Right hemisphere is often stronger for...

58

Trap: 'Right brain = creative, left brain = logical' is a strict rule. True or false?

59

Most motor control is ipsilateral (same side). True or false?

60

Where do many motor pathways cross (basic)?

61

Limbic system is mostly about...

62

Hippocampus is mainly for...

63

If someone can't form new memories after brain damage, suspect...

64

Amygdala is mainly for...

58

False.

57

Spatial attention and some nonverbal processing (classic).

60

In the brainstem (around the medulla).

59

False. It's mostly contralateral (opposite side).

62

Forming new long-term memories (especially facts/events).

61

Emotion, motivation, and memory.

64

Emotion processing, especially fear/threat.

63

Hippocampus (medial temporal lobe).

65

If a question screams 'fear response', your first brain structure guess is...

66

Trap: hippocampus is mainly for 'fear'. True or false?

67

Trap: amygdala is mainly for 'new memory storage'. True or false?

68

Hypothalamus is mainly about...

69

Hypothalamus controls the pituitary gland. True or false?

70

If a question says 'thermostat of the body', think...

71

If a question says 'controls hunger/thirst', think...

72

Thalamus vs hypothalamus: which is the sensory relay?

66

False.

65

Amygdala.

68

Homeostasis: temperature, hunger, thirst, and autonomic control.

67

False.

70

Hypothalamus.

69

True.

72

Thalamus.

71

Hypothalamus.

73

Thalamus vs hypothalamus: which controls homeostasis/hormones?

74

Pituitary gland is famous for being the...

75

Where is the pituitary located (basic)?

76

Growth hormone (GH) is released by the...

77

Trap: pituitary is part of the temporal lobe. True or false?

78

Basal ganglia are mainly for... (basic)

79

Cerebellum vs basal ganglia: which one smooths/coordinates movement?

80

Cerebellum vs basal ganglia: which one is more about initiating/selecting movement patterns?

74

'Master gland' that releases hormones controlling other glands.

73

Hypothalamus.

76

Anterior pituitary.

75

At the base of the brain, under the hypothalamus.

78

Starting/stopping and selecting movements (movement control circuits).

77

False.

80

Basal ganglia.

79

Cerebellum.

81

If someone has shaky, uncoordinated movement (ataxia), suspect...

82

If someone has trouble starting movements (very slow initiation), which system is classically involved?

83

Brainstem parts (in order top -> bottom):

84

Medulla oblongata is famous for controlling...

85

Pons is known for... (basic)

86

Midbrain is involved in... (basic)

87

Reticular activating system (RAS) is mainly for...

88

Why is brainstem damage so dangerous (basic)?

82

Basal ganglia circuits.

81

Cerebellum.

84

Breathing and heart rate (vital centers).

83

Midbrain, pons, medulla.

86

Visual/auditory reflexes and movement control pathways.

85

Relaying signals and helping regulate breathing/sleep.

88

It can knock out vital automatic functions like breathing and heart rate.

87

Wakefulness/alertness.

89

Cranial nerves mostly come from the...

90

Trap: cerebellum controls breathing rate directly. True or false?

91

Swallowing/coughing/vomiting reflex centers are mainly in the...

92

Cerebellum mainly fixes what kind of problems?

93

Ataxia means...

94

Cerebellum helps with motor learning like...

95

If someone has balance problems + unsteady gait, suspect...

96

Hard trap: cerebellar damage tends to affect the... side of the body.

90

False.

89

Brainstem.

92

Timing/accuracy problems (coordination), not 'can't move at all'.

91

Medulla (brainstem).

94

Practicing a skill until it becomes smooth (e.g., riding a bike).

93

Uncoordinated, clumsy movement.

96

Same side (ipsilateral) more often.

95

Cerebellum (or vestibular system), but cerebellum is high-yield.

97

What are the meninges?

98

Meninges layers (outer -> inner):

99

Dura mater is the... layer.

100

Pia mater is the... layer.

101

Subarachnoid space contains...

102

CSF main jobs (2 big ones):

103

CSF is produced mainly by the...

104

Ventricles are...

98

Dura mater, arachnoid mater, pia mater.

97

Protective membranes covering the brain and spinal cord.

100

Inner layer that hugs the brain surface.

99

Outer tough layer.

102

Cushion the brain and help remove waste/maintain chemical environment.

101

Cerebrospinal fluid (CSF).

104

Fluid-filled spaces in the brain where CSF is made/circulates.

103

Choroid plexus in the ventricles.

105

Hydrocephalus is basically...

106

Meningitis is...

107

Blood-brain barrier (BBB) is basically...

108

BBB is useful because the brain needs a...

109

Astrocytes do what (high-level)?

110

Microglia are basically the brain's...

111

Oligodendrocytes do what?

112

Schwann cells do what?

106

Inflammation/infection of the meninges.

105

Too much CSF buildup -> enlarged ventricles and increased pressure.

108

Stable chemical environment.

107

A selective filter that controls what leaves the blood and enters brain tissue.

110

Immune cleanup cells (like macrophages).

109

Support neurons, help maintain BBB, and regulate the brain environment.

112

Make myelin in the PNS.

111

Make myelin in the CNS.

113

Ependymal cells are linked to...

114

Trap: glial cells are just 'brain filler' and do nothing. True or false?

115

Scenario: can't plan, impulsive, bad decisions. Which lobe is the classic hit?

116

Scenario: weakness/paralysis on right side (voluntary movement). Where's the lesion likely?

117

Scenario: loss of touch/proprioception on left side. Where's the lesion likely?

118

Scenario: sudden loss of vision (with normal eye exam). Where do you look in the brain?

119

Scenario: hearing problems + trouble understanding spoken words. Which lobe is involved?

120

Scenario: clumsy movement, poor balance, 'drunk walking' without alcohol. What brain part?

114

False.

113

Lining ventricles and CSF production/circulation.

116

Left frontal lobe motor cortex.

115

Frontal lobe (prefrontal cortex).

118

Occipital lobe.

117

Right parietal somatosensory cortex.

120

Cerebellum.

119

Temporal lobe.

121

Scenario: can't stay awake / severe decreased alertness. Suspect damage to...

122

Scenario: can't regulate temperature/hunger/thirst properly. Suspect...

123

Scenario: sensory signals aren't getting to cortex properly (relay problem). Suspect...

124

Scenario: breathing control is knocked out. Suspect...

125

Cerebellum sits...

126

Brainstem sits...

127

Hippocampus is located mainly in the... lobe.

128

Amygdala is located near the...

122

Hypothalamus.

121

Reticular activating system (brainstem).

124

Medulla (brainstem).

123

Thalamus.

126

Between the cerebrum and the spinal cord.

125

At the back of the brain, under the occipital lobes, behind the brainstem.

128

Medial temporal lobe (near hippocampus).

127

Temporal lobe (medial temporal).

129

Basal ganglia are...

130

Thalamus + hypothalamus together are called the... (basic term)

131

Pineal gland is linked to... (basic)

132

Pituitary gland is sometimes called the 'master gland' because it...

133

CSF flow (simplified): starts in...

134

Hard version CSF flow order:

135

CSF is reabsorbed back into blood mainly via...

136

BBB makes treating brain infections harder because...

130

Diencephalon.

129

Deep nuclei inside the cerebrum (subcortical), not on the surface.

132

Controls many other endocrine glands via hormones.

131

Melatonin and sleep-wake timing.

134

Lateral ventricles -> third ventricle -> cerebral aqueduct -> fourth ventricle -> subarachnoid space.

133

Ventricles (made by choroid plexus), then flows to subarachnoid space.

136

Some drugs can't cross easily into brain tissue.

135

Arachnoid granulations into venous sinuses (simplified).

137

BBB vs meninges: are they the same thing?

138

Parkinson is often described as a basal ganglia problem. Conceptually, what's affected?

139

Right hemisphere damage can affect speech in a different way:

140

Thalamus is a relay for sensory info. Is it also involved with motor circuits?

141

Hypothalamus controls autonomic stuff by talking to...

142

If a question says 'set point' (temperature, hunger), that's usually...

143

Myelin's main job:

144

If myelin is damaged, nerve signaling tends to become...

138

Starting/smoothing movement (movement becomes slow/rigid).

137

No. BBB is a filter in brain capillaries; meninges are protective membranes around the brain.

140

Yes, it also relays some motor signals (basic).

139

The emotional tone/intonation (prosody) more than words.

142

Hypothalamus language.

141

Brainstem and endocrine system (pituitary).

144

Slower and less reliable.

143

Speed up nerve signal conduction.

145

Trap: myelin is made by neurons. True or false?

146

Sensory relay station to the cortex:

147

Body homeostasis control center (temperature, hunger, thirst):

148

Coordinates movement and balance:

149

Controls breathing and heart rate (vital centers):

150

Connects left and right hemispheres:

151

Speech production area:

152

Language comprehension area:

146

Thalamus

145

False.

148

Cerebellum

147

Hypothalamus

150

Corpus callosum

149

Medulla

152

Wernicke's area

151

Broca's area

153

Primary visual cortex lobe:

154

Primary motor cortex lobe:

155

Primary somatosensory cortex lobe:

156

Frontal lobe: {{c1::planning/decision}} + {{c2::voluntary movement}}.

157

Parietal lobe: {{c1::touch/somatosensory}} + {{c2::spatial awareness}}.

158

Temporal lobe: {{c1::hearing}} + {{c2::memory}} (+ language comprehension).

159

Occipital lobe: {{c1::vision}}.

160

Broca = {{c1::speech production}};
Wernicke = {{c2::speech comprehension}}.

154

Frontal

153

Occipital

156

Frontal lobe: planning/decision + voluntary movement.

155

Parietal

158

Temporal lobe: hearing + memory (+ language comprehension).

157

Parietal lobe: touch/somatosensory + spatial awareness.

160

Broca = speech production;
Wernicke = speech comprehension.

159

Occipital lobe: vision.

161

Precentral gyrus = {{c1::motor}}; postcentral gyrus = {{c2::sensory}}.

162

Thalamus relays most senses except {{c1::smell}}.

163

Meninges order (outer->inner): {{c1::dura}} -> {{c2::arachnoid}} -> {{c3::pia}}.

164

Oligodendrocytes myelinate the {{c1::CNS}}; Schwann cells myelinate the {{c2::PNS}}.

165

Cerebellum = {{c1::coordination}}; basal ganglia = {{c2::movement selection/initiation}}.

162

Thalamus relays most senses except smell.

161

Precentral gyrus = motor;
postcentral gyrus = sensory.

164

Oligodendrocytes myelinate the CNS;
Schwann cells myelinate the PNS.

163

Meninges order (outer->inner):
dura -> arachnoid -> pia.

165

Cerebellum = coordination; basal
ganglia = movement selection/initiation.