Basal Ganglia

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introduction

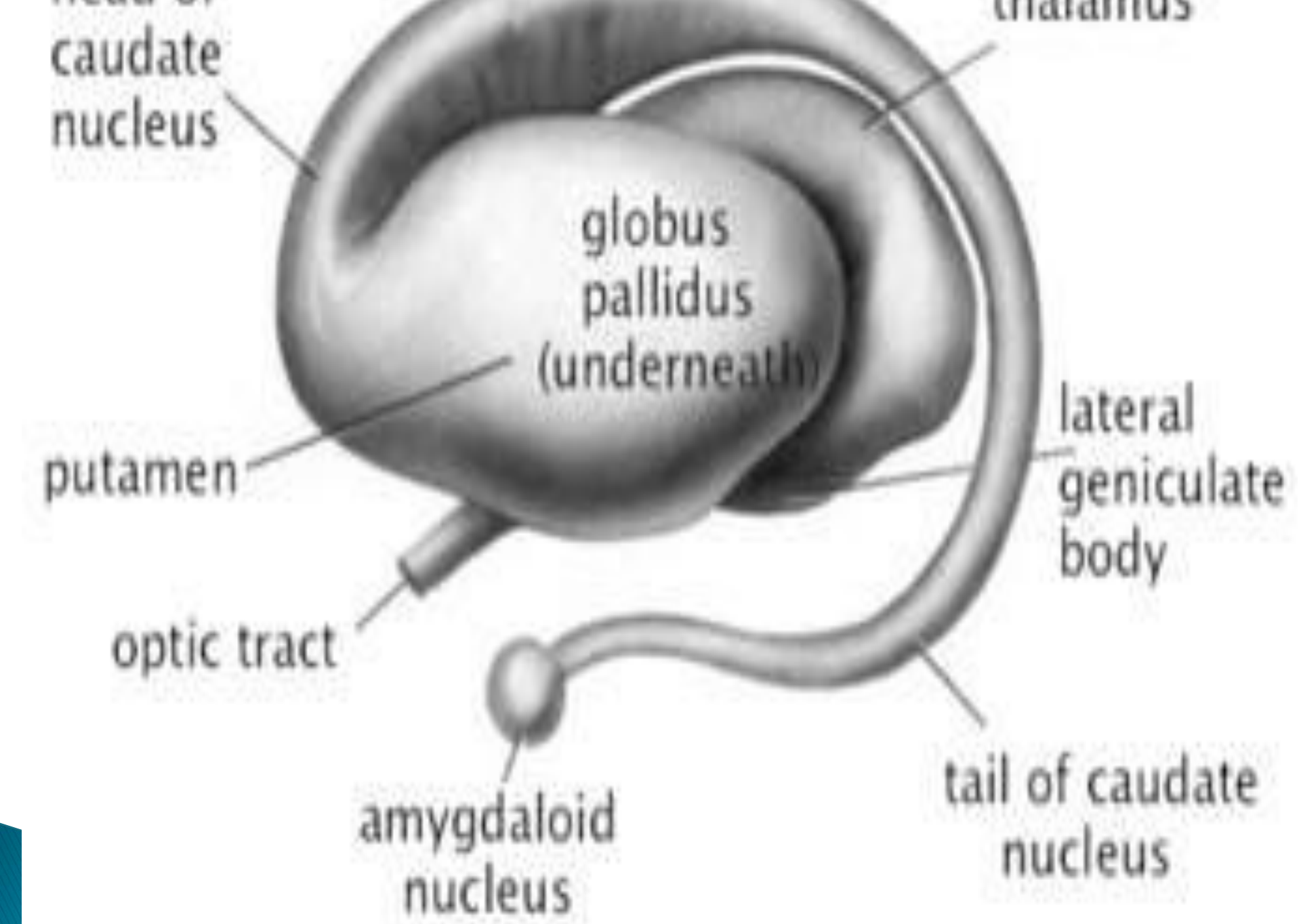
- Basal ganglia are sub cortical nuclear masses
- In the white matter below the crebral cortex.
- Basal ganglia is misnomor
- In lower animals they are exicuting as motor cortex
- Rich blood supply
- In infants &children BBB is weak and succeptible to diseases like kernecterus.
- Play imp. role in cotrol of muscle tone and motor control.
- Their action is indirect influence[extra pyramidal system.
- Rich in copper content [SN]

components

- 1]Caudate nucleus
- 2]Putamen
- 3]Globus pallidus
- 4]Substantia nigra
- 5]Sub thalamic nuclii of LUYS
- PUTAMEN+CAUDATE NUCLEUS =CORPUS STRIATUM.
- PUTAMEN+GLOBUS PALLISUS=LENTIFORM NUCLEUS

Connections

- Afferent [inputs]
- 1]Corpus striatum=;-putamen+caudate
- nucleus
- -cortico-striate projections—gluteminirgic.
- Thalamo-striate-va,al,and centromedian nucleus of thalamus.
- Nigrostriate --parcompacta of SN-prefrontal cortex
- Raphe striate -[serotonergic]
- Locus cerulius—striate—red nucleus[rubro spinal[noradrenergic]

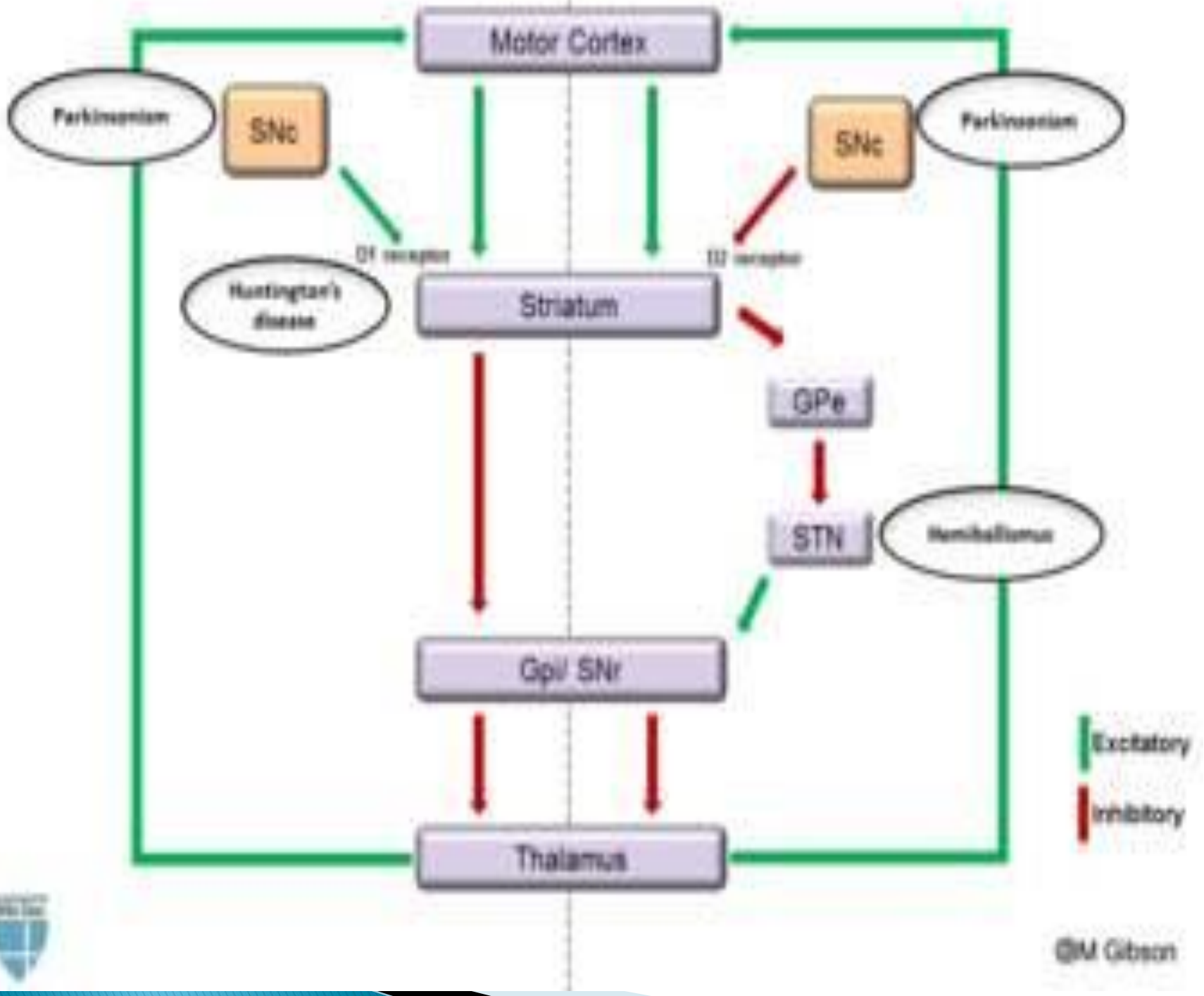

caudate
nucleus
globus
pallidus
(underneath)
putamen
lateral
geniculate
body
optic tract
amygdaloid
nucleus
tail of caudate
nucleus

Neuro transmitters

- 1] inhibitory exitatory
- DOPAMIN E CHOLINERGIC
- GABA
- GLUTAMIN

Connections

- Afferents[inputs]
- From cerebral cortex --all parts[putamin]
- tEfferens [outputs]
- --to other components of BG
- Thalamus;-va,vl ,vm nuclei.

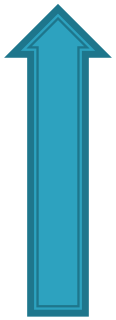

Motor Cortex
Parkinsonism
SNc
SNc
Parkinsonism
D1 receptor
D2 receptor
Huntington's disease
Striatum
GPe
STN
Hemiballismus
GpI/ SNr
Thalamus
Excitatory
Inhibitory
@M Gibson

Functional neural circuits

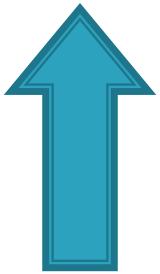
- Cerebral cortex

Corpus striatum

- G.P/S.N



THALAMUS



suppli.motor cortex

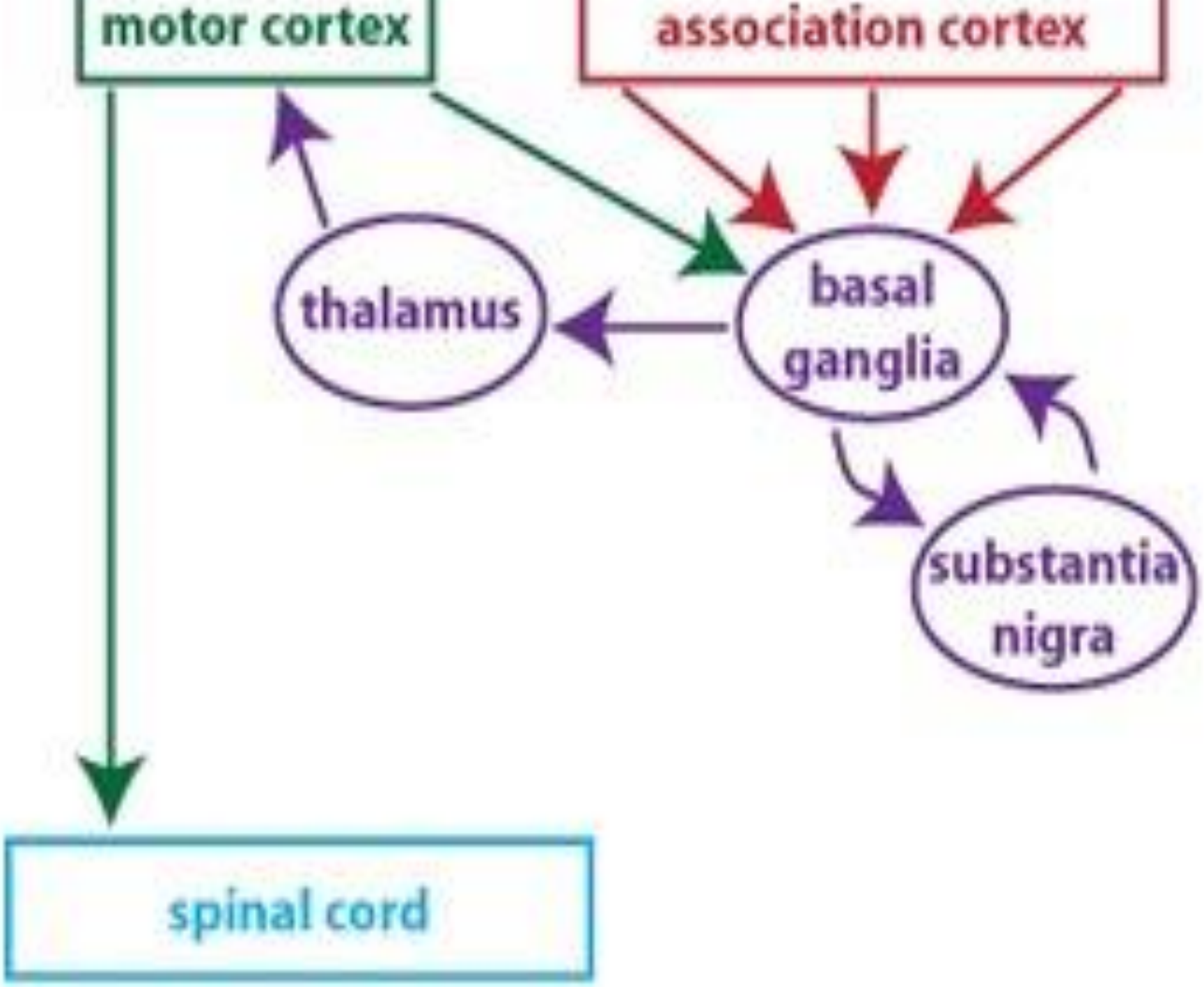
Putamen loop

- F rontal asso.area
- putamen
- GP[i]
- Thalamus [va]
- Parvocellular

SN[pr]

TH

magnocellular


motor cortex
association cortex
thalamus
basal ganglia
substantia nigra
spinal cord

functions

- 1]control of voluntary motor activity— cognitive motor control.
- 2]control of reflex muscular activity-control of eye movements.
- 3]control of Muscle Tone
- 4]role in Arousal mechanism
- 5]planning and programming -[timing and scaling
- 6]subconscious exicution of asso movements
- swinging of arms during walking.crude movementsof muscles of fascial expressionsduring emotions.
- 7]regulation of postural adjust ments visual and labirhynthine reflexes
- 8]muscle tone—inhibitory effect -lesion results in RIGIDITY

dIsorders

INTRODUCTION

- Described by James Parkinson.
- occurs sporadic idiopathic form.
- – loss of dopaminergic neurons and receptors
- Has both hyper and hypo kinetic features
- Cause ‘;–degeneration of nigro– striatal dopaminergic neurons.
- Mostly affected are fibres to the Putamen
- Age ;– occurs in middle and elderly people.

causes

- Causes ;-
- Fibres of Putamen[inhibitory] are affected,
- Gradually progress with age.
- Symptoms appear when 60-80% are lost.
- Complication of phenothiazine group of tranquilisers .
- Injection of heroin producing mptp-a pro drug producingMAO2 in astrocytes.I

Clinical features

- 1]hypo kinetic;- hyperkinetic
- rigidity -cogwheel type
- Akinesia Tremor-.at-rest
- Bradykinesia loss of asso.movement like swinging of armsduring walking.
- Pathogenesis view is the imbalance b/w exitation and inhibition in basal ganglia -loss of dopapaminergic inhibition in putamen-increase of inhibitory out put in GP[is]-dicreasebin inhibitory control fron STN-increase in exitatoryout put GP[is] -increase of[-] TH---[-]exitatory drive of cerebral cortex

Hypokinetic

- 1]presence of rigidity in nerve groups
- Expression less face [mask face].
- 2]tremor at rest .
- 3]akinesia ;-difficulty to initiate movements
- [Progressiveloss of d1 fibres inSN]
- 4]GAIT;-festinent gait small stepping gait .
- 5]micrographia - letters small

hyperkinetic

- 1]huntingtons disease
- -autosomal dominent,
- -genetically transmitted
- -starts in fifth decade of life
- Features ;-
- chorei form[flicking movements]
- -Severe dementia
- Cause ;-lossof GABAergic fibres in caudate and
- putamen

Treatment

- Admn of L-DOPA can cross the BBB helps repair of dopamine defficiency.
- Surgical—making lesions in GP[pallidotomy]
- -implant dopamine secreting tissue from foetal stiatal tissue.

God bless you

- Thank you
- Wishing all
- Bright future.
- Bye children