

Central regulation of viscera

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Hypothalamus

- ▶ Component of diencephalon (cerebrum)

- Thalamus

- posterior:

- Epithalamus

- Pineal gland

- Habenula

- Posterior commissure

- Subthalamus (inferior to the thalamus)

- Hypothalamus (interior and inferior)

- Mamillary body (small nucleus hanging of hypothalamus)

- Pituitary gland

- Optic chiasma

- Lamina terminals (border of hypothalamus)

- Anterior commissure

Nucleus for visceral regulation

► Pituitary gland

Tuber cinereum (funnel shape)

Infundibulum (extends down into pituitary gland)

Medial zones

Preoptic zone Medial preoptic nucleus

Supra optic zone Suprachiasmatic nucleus

Supra optic nucleus

Periventricular nucleus

Anterior hypothalamic nucleus

Tuberal zone Arcuate nucleus (monster)

Ventral medial nucleus

dorsal medial nucleus

Mamillary zone Mamillary nuclei

Posterior hypothalamic nucleus

Lateral zone

Lateral hypothalamic nucleus

Functions

- ▶ Autonomic nerves system
- ▶ Endocrine system (master)
- ▶ Limbic system (Epicenter)

Limbic system (emotion, fear, anger, motivation, feeding behaviors)

Mamillary bodies (memory consolidation)

- Reflex of olfaction

- Episodic memory

- Papez circuits

Hippocampus to fornix to mamillary body

- Mamillary body to anterior thalamic nucleus (mamillothalamic tract)

- Anterior thalamic nucleus to cingulate gyrus to hippocampus

Amygdala

- amygdala to mamillary bodies (Stria terminalis)

ventral amygdalofugal pathway

Arcuate nucleus

alpha melanocyte stimulating hormone

+Ventral medial nucleus

+Corticotropin releasing hormone

+Satiety

Neuropeptide Y and aguti-regulating peptide

+Lateral hypothalamic nucleus

+ Orexins

+ hunger

Regulating centers of hunger and satiety

Increase fat storage

+ adipocyte +leptin + satiety +ventral medial nucleus

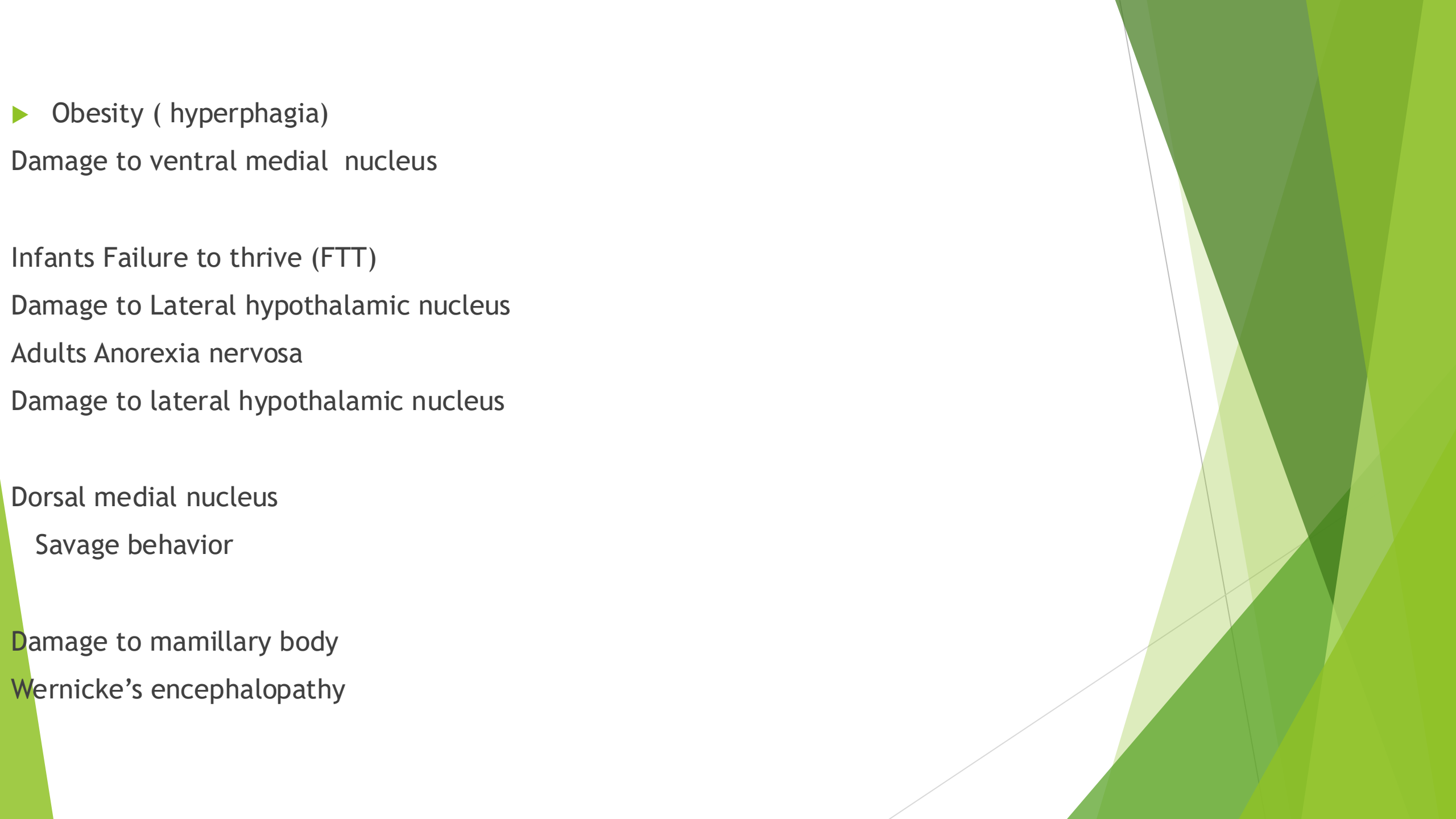
Pancreas

+High glucose level +Beta cells +Insulin + Satiety + ventral medial nucleus

GIT

+Stretching reflex in GIT +Vagus nerve +satiety + ventral medial nucleus

+ fasting + Ghrelin + Hunger +Lateral hypothalamic nucleus

The background of the slide features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, ranging from light lime to dark forest green. These shapes are concentrated on the right side and bottom of the slide, creating a modern, dynamic feel.

► Obesity (hyperphagia)

Damage to ventral medial nucleus

Infants Failure to thrive (FTT)

Damage to Lateral hypothalamic nucleus

Adults Anorexia nervosa

Damage to lateral hypothalamic nucleus

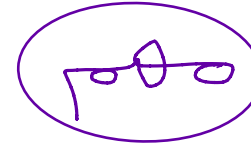
Dorsal medial nucleus

Savage behavior

Damage to mamillary body

Wernicke's encephalopathy

Endocrine function



Hypothalamic Hypophyseal portal system

- ▶ Arcuate nucleus
Releasing factor and inhibiting factor
Hormones through portal system to different types of cells
in **anterior pituitary**

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Growth hormone releasing hormone and inhibiting hormone

Somatotropic cells to release GH

Bones , cartilage, liver all the adipocyte

Corticotropin releasing hormone , Corticotropin inhibiting hormone

Corticotropin cells

ACTH adrenal cortex cortisol

- Prolactin inhibiting hormone (dopamine)
lactotrophs
Prolactin memory glands milk



Thyroid tropine releasing hormones, thyroid inhibiting hormone
thyrotropes
TSH thyroid gland T3 and T4

Medial preoptic nucleus (sexually dimorphic)

Gonadotropin releasing hormone and gonadotropin inhibiting hormone

FSH and LH

FSH estrogen production female

FSH sperm production male

LH progesterone production female

LH testosterone male

Hypothalamic hypophyseal tract



Supraoptic nucleus axons to posterior pituitary

+Hypertonic plasma

+Angiotensin 2

ADH (blood vessels and kidneys)

Paraventricular nucleus axons to posterior pituitary

+Suckling and uterine stretch

Oxytocin uterus contraction breast muscle and cause milk ejection

Suprachiasmatic nucleus (circadian rhythm) wake and sleep cycle

light retina optic nerve Suprachiasmatic nucleus Retinal hypothalamic tract

dark nucleus pineal gland melatonin

Damage to the nucleus Insomnia

Autonomic

► Anterior hypothalamic nucleus

Parasympathetic nervous system

Dorsal longitudinal fasciculus

Cranial

Edinger Westphal nucleus CN III pupillary constrictions

Superior salivatory nucleus CN VII facial

Inferior salivatory nucleus CN IX glossopharyngeal

Dorsal nucleus of vagus CN X

Brain stem Reticular formation system sensory types of information

deep medulla Nucleus tractus solitarius (visceral sensation)

Sacral (S2-S4)

Preganglionic parasympathetic





- ▶ Posterior hypothalamic nucleus
(hypothalamic spinal tract)

Sympathetic fibers (T1 to L2)

Preganglionic of sympathetic neurons

Thermoregulation

► Anterior hypothalamic nucleus

Decrease temp

Vasodilation of cutaneous vessels

Sweating

Posterior hypothalamic nucleus

Increase temp

Vasoconstriction

Shivering

Connection of hypothalamus limbic system

- ▶ Prefrontal cortex
- ▶ Reticular formation

Median fore brain bundle

- ▶ Amygdala (emotions)

Stria terminals

Ventral amygdalofugal pathway

Hippocampus (memory)

Fornix