

THE ENDOCRINES

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This short paper will serve to update information presented by Clive H. Giraud, F.I.O. (Syd.) in his paper *The Endocrine Glands*. The current paper's information was derived from *Gray's Anatomy*¹, *The Mayo Clinic Family Health Book*², and *Primary Eyecare in Systemic Disease*³. This paper is by no means complete, and the reader is urged to pursue more extensive sources for additional information.

Thyroid This gland sets the rate at which the body functions by stimulating cellular metabolic rate. Thyroid hormones increase sensitivity of tissues to adrenaline and noradrenaline. Its hormones are:

Tri-iodothyronine (T₃) & Tetra-iodothyronine (T₄).

Over-production of thyroid hormones produces *thyrotoxicosis exophthalmic goiter*.

Under-production produces *myxoedema* in adults and *cretinism* in infants.

Graves' Disease - from production & release of excess thyroid hormones.

Hashimoto Disease - chronic auto-immune thyroiditis.

Parathyroids Parathyroid hormone (PTH) controls level and distribution of calcium and phosphorus in the body.

Pituitary This gland releases hormones that regulate other endocrine glands and non-endocrine tissue. It is divided into two regions which secrete these hormones:

Adenohypophysis (derivative of stomatodeum)

Somatotropin (STH) - control of body growth.

Mammotropin (LTH) - controls breast growth & secretion.

Adrenocorticotropin (ACTH) - controls adrenal cortical hormones.

Thyrotropin (TSH) - stimulates thyroid.

Follicle-stimulating hormone (FSH) - stimulates estrogens and spermatogenesis.

Interstitial-cell-stimulating hormone (ICSH) - stimulates androgen.

Leutenizing hormone (LH) - stimulates progesterone.

Melanocyte-stimulating hormone (MSH) - increases cutaneous pigmentation.

Neurohypophysis (connected to hypothalamus)

Vasopressin (Anti-diuretic hormone, ADH) - controls renal water reabsorption.

Oxytosin - contraction of uterine and mammary non-striated muscle.

Pineal An endocrine gland of major regulatory importance, modifying activity of the adenohypophysis, neurohypophysis, endocrine pancreas, parathyroids, adrenal cortex, adrenal medulla and gonads. It has a circadian rhythm causing changes in plasma melatonin levels (increasing in darkness, decreasing in light). Photic stimuli, in particular intensity changes of yellow-green light acting on rhodopsinoid retinal pigment, seem to be involved in this rhythm.

Pancreas This gland produces enzymes for the digestion of food and regulates the body's use of glucose. It produces three hormones:

Insulin - increases blood glucose.

Glucagon - breaks down glycogen (surplus glucose) stored in liver.

Somatostatin - regulates production & release of insulin and glucagon.

Diabetes - body cells unable to use glucose from decreased insulin activity.
Hypoglycemia - blood glucose below normal levels.

Adrenals These glands produce:

Adrenaline (epinephrine) and Noradrenaline (norepinephrine) - increase heart rate and blood pressure, among many systemic effects, usually caused by physical and/or emotional stress.

Corticosteroids

- a) Sex hormones - androgens & estrogens.
- b) Hydrocortisones (glucocorticoids, e.g., cortisol) - glycogen formation.
- c) Mineralocorticosteroids (aldosterone) - controls sodium & potassium.

Cushing Syndrome - chronic excess cortisol secretion.

Conn Syndrome - chronic excess aldosterone secretion.

Addison Disease - primary cortical adrenal insufficiency.

Supra-renals These glands produce aldosterone, which regulates electrolyte and water balance, have control over lymphocytes and lymphoid tissue and may secrete some sex hormones.

Coccygeal The function of this gland is still unknown.

Carotid There is no reference to a "carotid" gland in *Gray's Anatomy*. There is, of course, the *parotid* gland, which is a salivary gland.

The assertion⁴ that selected light frequency therapy, applied by way of the eyes, directly stimulates the sympathetic and parasympathetic nervous systems implies that endocrine glands and the hormones they produce may possibly be regulated by such therapy. The fact of treatment of Seasonal Affective Disorder with light is but one example. This is an area ripe for research and experimentation.

References:

1. *Gray's Anatomy, Thirty-seventh Edition*, Churchill livingstone, New York, 1989.
2. *The Mayo Clinic Family Health Book*, Wm. Morrow & Co., New York, 1990.
3. Marks, E.S., Adanszyk, D.T., Thomann, K.H. *Primary Eyecare In Systemic Disease*, Appleton & Lange, Norwalk, CT, 1995.
4. Spitler, HR. *The Syntonic Principle*, The College of Syntonic Optometry, 1941.