

Subject: **Hormone Synthesis & Transport Mechanism**  
Medium: PhotoShop – 5, iMac, OX – 9  
Size: (Nominal)  
Working Time: 120 hours including research  
Completed:

Comments: This was the first use of computer illustration by the artist. Most of the image is created as with an electronic airbrush, 'darkroom.' Two fundamental positive aspects of computer illustration are the use of multiple layers allowing for more control, and 'history' where any mistakes can be easily removed by backspacing an unsatisfactory operation. The negative (to the illustrator) aspect is that the image only exists as a binary code with no 'original'

Notes: Of the two major control systems within the human body; the nervous system and the endocrine system, the latter is least known. However, the endocrine system combined with the neural network is vital in maintaining the status of the body. Unlike the direct Electro-chemical action of the nervous system which has almost immediate localised response, the endocrine system's of releasing what are called hormones into the blood stream, has a response time of seconds or even days. By a method of secretion through ductless glands the endocrine system (*Endo = within, crin = to secrete*) synthesises and releases organic molecules called hormones (*Hormon = to excite*) into the vascular system to be transported to the various targeted organs that make up the system. The interchange of the neuro-endocrine system is the hypothalamus, situated in the mid brain area over the spinal cord. Connected to the hypothalamus by a stem of tissue called the infundibulum is what was once called the master gland, but is now seen as a servant to the hypothalamus, the hypophysis or pituitary gland. The pituitary itself is divided into two main sections, the anterior or *adenohypophysis* which grew from the roof of the mouth and the posterior or *neurohypophysis* which originated from the third ventricle or *Diencephalon area* of the embryo brain. The two lobes are separated by the *pars intermedia* and the *hypophyseal cleft* (Rathke's pouch) although in the adult these are absorbed by the two outer lobes. The whole sits within the cavernous sinuses and is protected by cerebrospinal fluid. Although both the anterior and the posterior are involved with the production of hormones, their structure and function are fundamentally different. Whereas the adenohypophysis is a vascular system (longitudinal conducting tissue) of hormone synthesising cells, the neurohypophysis is an extension of the brain and stores hormones produced by neurosecretory cells from the hypothalamus. When, for example the sight of food coupled with the body's need for energy, neural and chemical signals are relayed by the hormone manager, the hypothalamus via neuro secretory cells to the relevant gland in the pituitary. Signals to the adenohypophysis terminate at the infundibulum where they meet up with blood vessels from the superior hypophyseal artery becoming the *hypophyseal portal system*. This arterial system is the adenohypophysis's own transport system where capillaries drain off into more arterioles instead of venules. These capillaries are termed *sinusoids* and are able to absorb the chemical signals secreted by the neurosecretory cells into the portal system at the primary plexus end of the infudibulum. These hormone signals are transported by the vascular sinusoid and entwine with the vascular collection of hormone synthesising cells in the adenohypophysis to either start or stop the process. If the message is to produce hormones, these are then despatched from the production line through the portal system and exit from the secondary plexus end to the targeted organs via the anterior hypophyseal vein. By contrast to the manufacturing process of the adenohypophysis, the neurohypophysis stores the hormones in bundles of long axon neuro-secretory cells from the hypothalamus. These synthesised hormones are released directly into the inferior hypophyseal artery when needed, to be delivered by the posterior hypophyseal vein.\*

\* Bibliography on next page



**Illustration**  
Stephen P Smith

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