GnRH – Gonadotropin releasing hormone

Posted on March 19, 2014 by Maxim Peptide

Gonadotropin releasing hormone, which is typically abbreviated GnRH is a trophic peptide hormone. This may also be referred to as lutenizing hormone releasing hormone or LHRH. The chemical is used by an animal’s body to produce follicle stimulating hormone or lutinizing hormone which is created in the anterior pituitary.

Natural GnRH is synthesized in the hypothalamus where the neurons will release it into the body as needed. Synthetic versions of the peptide attempt to mimic this action as a means of controlling the results that this peptide will naturally stimulate within the body.

The synthesized versions of GnRH are classified in the gonadotropin releasing hormones which are sold to peptide research facilities. This peptide is used in research to initiate the first step of the hypothalamic pituitary gonadal axis. The peptide will frequently be applied to living animal test subjects and it is not uncommon for it to be included in research that includes applications of multiple peptides to complete this process.

Researchers are also largely focusing on applying GnRH alongside other synthesized peptides to determine if they will interact the same way that these peptides do when they are naturally released by an animal.

Basic Production Information

GNRH1 is the gene which acts as the precursor for GnRH when it is produced naturally, so this will often be harvested to create a synthesized version of the peptide.

An animal contains the precursors for forming GnRH on chromosome 8. Mammals will synthesize this peptide from a 92 amino acid preprohormone which creates a linear decapeptide as the end product. This process typically occurs in the anterior hypothalamus.

The overall target of the GnRH mechanism appears to take on a regulatory role throughout the hypothalamic pituitary gonadal axis. An example of this would be inhibiting the rise of estrogen throughout the body when GnRH is produced.

GnRH has a standard structure for a peptide, and the sequence that is used to synthesize it stems from the amino terminus through the carboxyl terminus. Researchers also tend to omit the chirality when designating the structure of this peptide, which is quite common for the production of synthesized amino acids that are being produced in an L-form.

The abbreviation of portions of this peptide produced on their own is known as proteinogenic amino acids which generally refer to the pyroglutamic acid which is a derivative of glutamic acid. The formula also designates NH2 in the chain which notes the carboxyl terminus and designates that this peptide does not terminate with a free carboxylate but a carboxamide.
Natural Roles Synthesized GnRH Attempts to Mimic

When an animal produces GnRH in the pituitary it will stimulate a synthesis of follicle stimulating hormone, gondatropins and luteinizing hormone.

The process of releasing these hormones is controlled by the frequency that GnRH is released and the size of the pulses during this action. Feedback from estrogens and androgens will help to control these factors naturally. In general, low pulses cause an animal to produce follicle stimulating hormone but high frequency pulses will cause their body to release luteinizing hormone.

There is a noticeable difference in the way male animals produce GnRH, compared to the pulses of female animals. Males typically have consistent pulse frequencies but females see a variation of their pulse frequencies based on what point they are in their menstrual cycle. In general, before a female animal reaches ovulation they produce a surge of GnRH.

So far research indicates that GnRH is released with a pulsatile effect in all vertebrates, though only a few animals have been studied in clinical settings so there is not much evidence to fully confirm this theory. The presence of this peptide also appears to be necessary for animals to have proper reproduction function.

In studies that have been performed it appears as though animals produce a small amount of GnRH during youth or the puberty stage of development. When the animal reaches the point where they are capable of reproducing the pulse activity of GnRH is essential to developing this functionality and feedback loops are established to help the animal's brain to determine if this is developing properly.

GnRH does not appear to be essential to a female test subject’s body once that animal is pregnant and the presence of this peptide may in fact disrupt the process, leading to organic lesions or dysfunction.

Resource Box:
http://en.wikipedia.org/wiki/Gonadotropin-releasing_hormone