Introduction of Hormones, Chemical messengers and types of chemical messengers:

Today I'm going to discuss Unit 3 Hormones from the paper ZOC 105 Endocrinology.

We are going to have a look at the Introduction of hormones,

Chemical messengers, types of chemical messengers. Module number is 11.

I'm Dr. Deeparani Prabhu from PES'S RSN College Farmagudi and in this

particular module we will be looking at the concept of Chemical messengers and

the coordination that is brought about by the chemical messengers.

At the end of this module,we will be able to distinguish between the nervous

and chemical coordination also will be able to describe the concept of chemical

coordination and will be able to enlist the types of chemical messengers.

Now let us have a look at what exactly are hormones and why

there is a need for coordination.

With the advent of multicellularity during the course of evolution a need for coordination

between the cells was felt.

In the metazoans, basically the coelenterates, a nerve net was generated for bringing about

the coordination between the different cells. For a long time this process of coordination,

was thought to be the exclusive regulation of the nervous system.

But as the complexity grew across the vertebrates, subsequent discoveries have unraveled

a gamut of chemical messengers, which may be exclusive and somewhat autonomous and

independent of the nervous system.

Let us have a look at the types of coordination. Initially it was thought the coordination between the different cells,tissues and organs is being brought about by the nervous system.

Later on, the concept of endocrine system came into existence and as more and more discoveries and in depth studies were carried out, the concept of the neuroendocrine system has come into existence.

Nervous system is actually coordinating by neurons via the neurotransmitters that are released and travel across the synaptic cleft or the neuromuscular junction.

Endocrine system: Classically, the endocrine coordination is brought about by chemicals called hormones which are secreted by ductless glands into the bloodstream.

Neuroendocrine System: It is now known that the nervous and endocrine systems work together as an all encompassing communicative and integrative network called the neuroendocrine system.

Here, the feedback systems regulate chemical messengers in their short and long-term coordination of animal body function to maintain homeostasis.

What exactly is homeostasis?

It is the state of steady internal,physical and chemical condition maintained by the cells and tissues of the living organisms.

This is required for the optimal functioning of the organism and

there are many variables like body temperature, fluid balance,

pH of extracellular fluid, so different animals maintain body temperature within a range.

This is required for the optimal usage or optimal functioning of the Organism.

Homeostasis is basically a result of complex, interplay,interaction, and interdependence of

several independent processes, and this operates by number of mechanisms.

Let us move on to look at the base of Chemical coordination.

How exactly the term hormone has come into existence.

It was way back in 1902 Bayliss and Starling discovered a chemical substance

Secretin which was subsequently referred to as a hormone. Secretin is released from

the small intestine. When food enters the stomach, a chemical communication between

the intestinal walls and exocrine Pancreas occurs giving rise to the alkaline secretion from the

latter to neutralize the acidic chyme without involvement of the nervous system was

demonstrated by them. So here for the first time it was shown that there is something

other than the nervous system which is bringing about coordination.

Brother in law of Baylis Starling coined the term ‘Hormone’ to describe Secretin from

the Greek root- ‘to excite or set in motion.’

Let us define hormone. Hormones are generally considered to be chemical messengers

that are released from cells into the bloodstream to exert an action on target cells,

which are some distance away.

Gilleman has defined hormone as any substance released by a cell and which acts

on another cell near or far regardless of the singularity of ubiquity of the source and

regardless of means of conveyance,bloodstream, axoplasmic flow or

immediate intercellular space.

Schally and Gilleman shared the 1977 Nobel Prize in Medicine for their discoveries

concerning the peptide hormone production of the brain.

Chemical messengers: Let us now have a look at what exactly we mean by Chemical Messenger.

It is any substance produced by a cell that plays or physiological role in the

control of the activity of another cell.

Hormone is any substance elaborated by one cell to regulate another cell and maybe

delivered in an endocrine,paracrine, autocrine or pheromonal route.

Let us look at the classification based on the mode of delivery:

Endocrine where the messenger is bloodborne.

Neurocrine where the peptide hormone is released by a nerve and is bloodborne

Paracrine where the released hormone diffuses to the edges and target cells through

the immediate extracellular space.

Autocrine, where the hormone may feedback to the cell of origin to regulate its

own release.

Let us have a look at the list of the chemical messengers that are

present across the different vertebrates.

1.Neurohormones,

2.Neurotransmitters

3. Neuropeptides

4. Non peptidergic messengers

5.Lumones

6.Chalones

7.Local chemical messengers

8. Hormones,

9.Pheromones,

10.Growth Factors and

11.Eicosanoids

are the different chemical messengers that we are going to study. We will be studying them

in depth in the subsequent module.

Let us have a look at the references

Endocrinology by Hadley

and Textbook of Endocrinology by Williams are the two books that

we refer extensively for the hormones or basically for

endocrinology. Number of papers have also been referred from the net of which I will be giving

you all the information in the different quadrants.

Thank you.