

**Semester II.**

**Pharmacology**

**Laboratory 13**

**Vitamins and hormones**

**1. Pharmacognosy**

**2. Pharmacodynamics**

▶ **The action of insulin**

▶ **Oxytocin action of presoxin**

**3. Pharmacography**

**4. Classification of substances with an effect on metabolism**

# 1. Pharmacognosy

- ▶ analeptic nutritional supplement
- ▶ plastic substances
- ▶ roburants
- ▶ antibiotics, growth promoters
- ▶ standardized product of these substances

## 2. Pharmacodynamics

### ▶ The action of insulin

- ▶ injecting 5 IU insulin per kg body, intravenously, after a while, the insulin shock occurs which results in severe convulsions, after which the animal enters a coma.
- ▶ If glucose is injected immediately into the 40% solution intravenously, calculating 1 g per kg body weight, it can be seen that the animal is recovering shortly.
- ▶ The convulsive effects of insulin are due to a marked decrease in blood sugar, which affects the whole body, but especially on the nervous system for which glucose is the essential metabolic element.
- ▶ Thus, it has been observed that in the central nervous system, following insulin hypoglycemia oxygen consumption halves.

## 2. Pharmacodynamics

### ▶ The action of insulin

- ▶ Insulin hypoglycemia occurs through a complex mechanism: insulin stimulates hexokinase (which catalyzes glucose phosphorylation), promotes glycogen deposition in the liver and muscle, and glucose uptake into cells by active mechanisms that utilize energy resulting from oxidative phosphorylation. Lipogenesis is also stimulated in the liver.
- ▶ Compensation in hypoglycemia produced by insulin is achieved by reflex mechanisms that tend to restore the blood level of glucose.
- ▶ Thus, the processes of glycogenolysis are stimulated by the neurovegetative pathway (by increasing sympathetic tone) and by neuroendocrine pathway (by glucagon intervention).
- ▶ It is also stimulated by the neuroendocrine pathway through the effect of somatotropic, adreno-corticotropic, and corticosteroid hormones.
- ▶ At the same time through the influence of vascular and tissue chemoreceptors, glucose consumption in the body decreases.

## 2. Pharmacodynamics

### ▶ The action of insulin

- ▶ At moderate amounts of insulin, the mechanisms shown may compensate for the hypoglycemia.
- ▶ However, if the doses are too high as in the case of the dose presented above, the possibilities of compensation are insufficient and a diabetic coma appears.
- ▶ The fact that intravenous glucose administration restores animal status is further evidence of the mechanism by which diabetic coma occurs.

## 2. Pharmacodynamics

### ▶ Oxytocin action of presoxin

- ▶ The uterus is collected from a female and mounted in an organ bath, making the contractions register.
- ▶ A small amount of presoxin 1% solution is introduced into the bath, followed by the appearance of uterine contractions, which are recorded graphically at the electrochemograph.
- ▶ If, after replacing the Ringer serum in the organ bath and washing the uterine fragment, a few drops of adrenaline are added in the dilute solution, the relaxation of the uterine muscles can be noticed.
- ▶ The experience can be done on fragments of uterus from sheep and sow, collected at the time of slaughter at the slaughterhouse, and kept in the Ringer serum in the refrigerator for even a few days.

# 3. Pharmacography

Rp./ Myofer 50 ml vials II

D.S. ext. in inj. i.m. 2 ml per piglet  
(antianemic)

Rp./ Fosfotonic 2% 10 ml vials X

D.S. ext. in inj. s.c. 2/day to cow  
(general tonic, plastic)

# 4. Classification of substances with an effect on metabolism

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## Analeptic nutritional supplement

- general
- special

## Plastic substances

- iron
- calcium
- phosphorus
- iodine
- sodium chloride

## Stimulants of metabolism

- ethyl alcohol
- arsenic
- antibiotics

## Biocatalysts

- liposoluble vitamins
- hydrosoluble vitamins

## Hormones and endocrine preparations

- estrogenic hormones
  - gonadotropic hormones
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