

ANABOLIC STEROIDS

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JPT 341 Pharmacology & Toxicology

BVM 3RD Year Lecture Notes

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2014

Lecture objectives

1. By the end of this lecture the students should be able;
 - ❖ To define and give examples of anabolic steroids.
 - ❖ To describe the mechanisms of action reproductive hormones and the resulting pharmacological effects
 - ❖ To state/highlight the clinical relevance of anabolic steroids in vet medicine

Lecture outline

1. Introduction
2. Examples of anabolic steroids
3. Mechanism of action and pharmacological effects of anabolic steroids.
4. Application of anabolic steroids in clinical veterinary medicine

Introduction

- Anabolic steroids are testosterone derivatives in which androgenic hormonal activity has been reduced relative to tissue building activity.
- The ratio of anabolic activity to that of androgenic activity is usually high and thus results in enhanced anabolic activity.
- Enhanced anabolic activity is achieved by analogue synthesis. Anabolic steroids are therefore used in animal production.

Examples of anabolic steroids

- Methyltestosterone
- Methylandrosterenediol
- Nandrolone
- Norethandrone
- Ethylestrenol
- Methandienone
- Drostanolone

Mechanisms of action of anabolic steroids

- Generally, synthetic androgenic anabolic steroids bind to the androgen receptor complexes and enter the cell nucleus.
- Thereafter, it binds directly to hormone response elements (HREs) which are specific nucleotide sequences of the chromosomal DNA.
- The binding causes downstream genetic transcriptional changes causing retention of nitrogen, potassium, and phosphorus; increasing protein anabolism while decreasing amino acid catabolism.

Pharmacological effects of anabolic steroids

- Have effect on nitrogen retention
- Promotes protein synthesis and electrolyte retention.
- Involved in bone formation especially ossification and transport of osteoblasts.
- Muscle build-up due to the anabolic effects.

Use of anabolic steroids in clinical vet. medicine

- Used in cases of debilitation as in pneumonic case.
- Used in case of severe parasitism and when the animal has lost weight.
- Used in case of post operative recovery.
- Used in case of bone surgery, given to increase bone formation.
- Used in underfed young animals where they enhance protein synthesis.

Use of anabolic steroids in clinical vet. medicine

- Anabolic steroids have been used extensively in veterinary medicine especially in meat production where they are given subcutaneously as pellets.
- Some anabolic steroid may be carcinogenic especially diethylstilbesterol.
- Prolonged use of the drugs may reverse the sex behavioral effects (androgenic activity).

Application of anabolic steroids in clinical veterinary medicine

- In veterinary medicine anabolic steroids has been misused in horse race.
- If food animal is treated with anabolic steroids, the animal must be withheld for at least 3 months before slaughter.

References

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