

Drugs used for doping of RACE horses

{ Lecture by Dr. Madhur

Money

Betting

To cope up with injuries

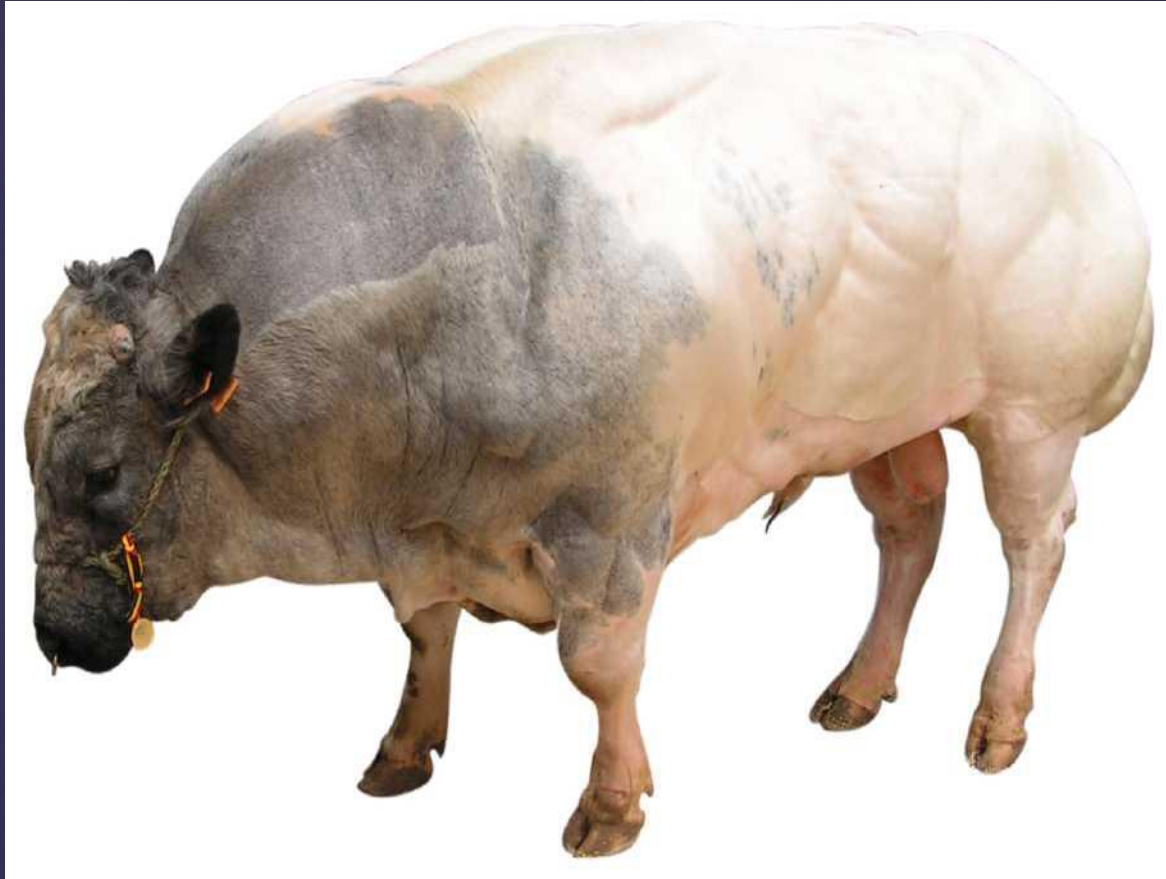
Natural ability is limited

Adrenaline

entertainment

Status symbol

Why doping?



- ⌘ Respiratory system
- ⌘ Relieve pain and inflammation
- ⌘ Increase energy and alertness(stimulants)
- ⌘ Muscle

Options?

- ⌘ (PEDs) are substances that are used to enhance athletic performance
- ⌘ The most common PEDs for racehorses are **anabolic** steroids, **blood-doping agents**, and **stimulants**
- ⌘ used to increase muscle mass, oxygen-carrying capacity, and endurance but can cause serious health problems in horses

What are PED?

- ⌘ **Stimulants:** Examples include caffeine, theobromine, and amphetamines.
- ⌘ **Pain relievers:** Examples include non-steroidal anti-inflammatory drugs (NSAIDs) such as phenylbutazone, flunixin, and ketoprofen.
- ⌘ **Pulmonary drugs:** Examples include bronchodilators, such as clenbuterol and albuterol, which open the airways in the lungs, making it easier for the horse to breathe.
- ⌘ **Tranquilizers=** relax horse(acepromazine)

Examples

⌘ Joint Supplements

- ⌘ Many racehorses receive joint supplements, such as **glucosamine and chondroitin**, to support joint health and mobility

⌘ Respiratory Medications

- ⌘ Respiratory medications, including bronchodilators and corticosteroids, are often used to manage respiratory conditions in racehorses, such as exercise-induced pulmonary hemorrhage (**EIPH**) and inflammatory airway disease.

⌘ Therapeutic Use Exemptions

- ⌘ Zilpaterol
- ⌘ Bisphosphonates
- ⌘ Omeprazole
- ⌘ Regumate
- ⌘ Altrenogest
- ⌘ Corticosteroids
- ⌘ Levothyroxine Sodium
- ⌘ Cetirizine
- ⌘ Hydroxyzine
- ⌘ Prednisolone
- ⌘ Testosterone

List of prohibited substances

- ⌘ M1- manipulation of blood and blood components
- ⌘ M2- chemical and physical manipulation
- ⌘ M3- gene doping

Prohibited methods

- ⌘ list isn't definitive
- ⌘ not all of the drugs are banned in their entirety.
- ⌘ Corticosteroids, for example, are necessary in certain medical circumstances.
- ⌘ '**stand down' period**, during which time a horse is not allowed to take part in a race
- ⌘ horses can't have '**any bisphosphonate** on the day of the race or on any of the 30 days before the day of the race in which the horse is declared to run'

DRUG	TYPE	SPEED
Methyl Amphetamine Methyl Phenidate Pemoline	Stimulants of CNS	++ ++ ++
Ephedrine Caffeine Theobromine Etamphylline	Stimulants of CNS and Cardiovascular system	0 + 0 0
Nitroglycerine	Vasodilator	0

Drugs having potential
stimulant action

EFFECTS

- Reduces the feeling of tiredness
- Stimulate CNS

SIDE EFFECTS

- Irritability and sleeplessness
- High blood pressure
- Irregular faster heartbeats

Stimulant

Drugs	Type	Speed
Morphine	Central analgesic and depressant	+
Acepromazine Etorphine Phenobarbitone	Depressant	+ 0 -
Acepromazine Promazine Azeperone	Tranquilizer	-
Phenylbutazone Prednisolone	Anti-inflammatory	0 +-

Drugs having depressant effects

- ⌘ increase muscle mass, strength, and endurance
- ⌘ synthetic versions of the male hormone testosterone improving their endurance and overall physical condition
- ⌘ They can also help to mask injuries
- ⌘ Stanozolol, Nandrolone, Boldenone, and Trenbolone

Anabolic steroids

⌘ These substances are designed to increase the number of red blood cells in a horse, which can increase oxygen-carrying capacity and improve performance

⌘ Law vs ethics

Blood doping agents

- ⌘ Rise in viscosity
- ⌘ Hypertension
- ⌘ renal damage
- ⌘ Weight gain

Side-effects

- ⌘ help horses lose weight and improve their performance and making them less fatigued.
- ⌘ **Furosemide (also known as Lasix)** used to treat a condition called exercise-induced pulmonary hemorrhage(EIPH)

Diuretics

EFFECTS

- Reduces fluid retention
- Cause rapid weight loss

SIDE EFFECTS

- Dehydration
- Muscle cramps
- Headache
- Nausea

Diuretics

⌘ promotes muscle growth and strength in animals, particularly cattle and horses.

Zilpaterol

EFFECTS

- Increase in muscle mass
- Increase in cardiac output
- Increase in lipolysis
- Bronchodilation

SIDE EFFECTS

- Tachycardia
- Increase in muscle tremors
- Headache
- Anxiety and restlessness

Beta-2 agonists

- ⌘ ELISA
- ⌘ **Confirmatory Testing** confirmation of positive ELISA tests using more sophisticated techniques such as gas or liquid chromatography combined with mass spectrometry (GC/MS, LC/MS, or LC/MS/MS)
- ⌘ Mass spectrometry is the **gold standard** drug identification
- ⌘ **Zero Tolerance Testing** even trace amounts of drugs are not tolerated

Detection

& Urine

& Hair

& Blood

& saliva

SAMPLES TAKEN

Acids and diuretics	LCHRMS
Bases	LCHRMS
Corticosteroids	CLHRMS
Quaternary compounds	LCMS
Acids, bases, neutrals	LCHRMS
Anabolic steroids	LCMS
Peptide	LCMS
Inorganic metal	ICP-MS
ELISA screens	

Drug screening methods