

Anabolic Steroids in Critical Care: Oxandrolone

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Presentation Objectives

- 🌐 Background to Anabolic-Androgenic Steroids (AAS)
- 🌐 Background on Oxandrolone
- 🌐 Literature Review
- 🌐 Health Canada's Position
- 🌐 Prescribing Issues
- 🌐 A 'How to' Guide to Obtain for Patient Use
- 🌐 Suggested Uses for Oxandrolone



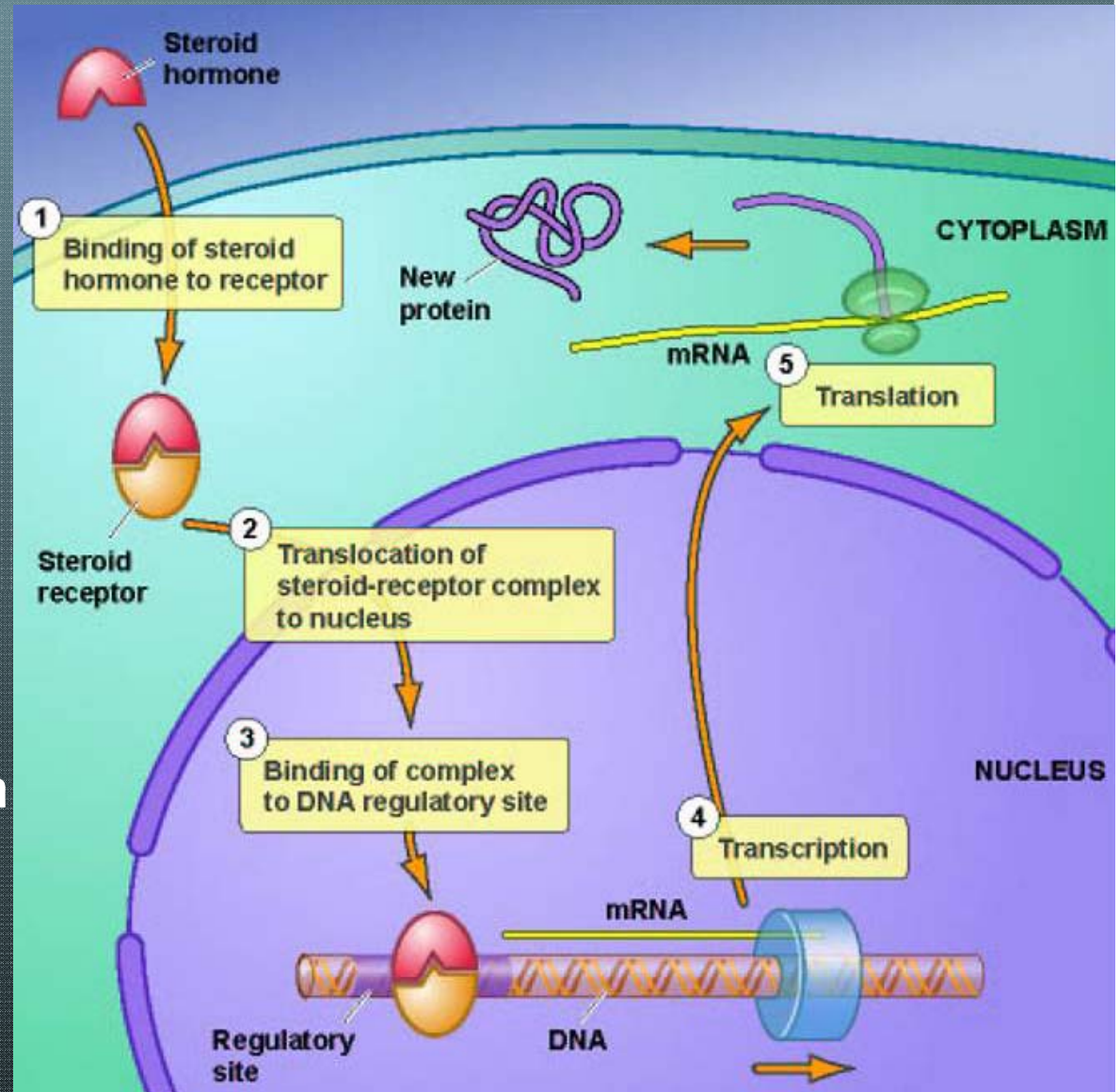
Background: AAS

- Common ICU associated conditions
 - Lean body mass loss
 - Anemia
 - Deconditioning
 - Impaired immune system
 - Lethargy
 - Decreased appetite
 - Impaired tissue healing and integrity
 - Impaired cellular metabolism



Background: How AAS Work

- AAS penetrate cell membrane of target cells
- Easily as they are fat-soluble
- Unlike peptide hormones
- AAS binds to Androgen Receptors in cytoplasm



Background: How AAS Work

- 🌐 Depending on the specific characteristics of AAS and the type of target cell, various effects are initiated:
 - 🌐 Increase synthesis of proteins
 - 🌐 Increase of rate and speed of transport of amino acids
 - 🌐 Block glucocorticoids
 - 🌐 Block development of fat-storage cells
 - 🌐 Increase BMR

Background: Effects of AAS

Anabolic Effects Of AAS	Androgenic Effects Of AAS
<ul style="list-style-type: none">• Increase protein synthesis• Increase amino acid transport through cell walls• Increase appetite• Increase bone, tendon, ligament structural integrity• Anti-catabolic: reduce cortisol secretion, and sensitivity• Promote IGF and HGH secretion• Increase erythropoietin synthesis• Retention of Nitrogen• Promote lean body mass development and fat loss	<ul style="list-style-type: none">• Change in primary and secondary sexual characteristics at puberty in males. Lifelong risk for females (AAS dependent)• Increase CNS efficiency: alertness, motivation, and mood• Increase aggressiveness• Increase libido

Background: Adverse Effects of AAS

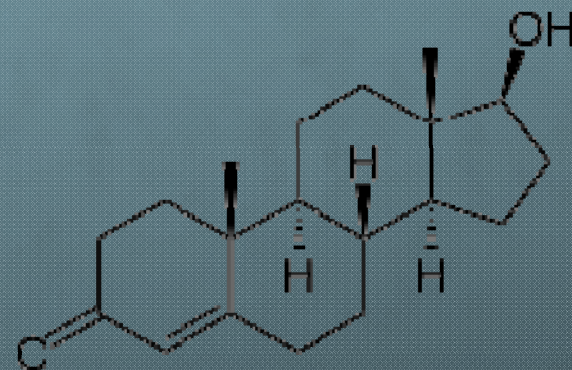
Adverse Effects of AAS (Effects are specific and variable to each AAS)

- Serum cholesterol changes (increase LDL, decrease HDL)
- HTN
- Hair loss (head)
- Virilization
- Liver damage
- LV structural changes
- Gynecomastia
- Testicular atrophy
- Acne
- Impaired sperm production
- Depression (Post Cycle)
- Sexual dysfunction (Post Cycle)
- Catabolism (Post Cycle)

Background: Families of AAS

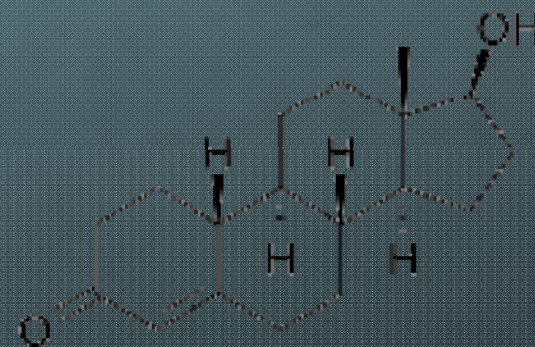
Testosterone Derived Steroids

Testosterone, Dianabol, Equipoise, Halotestin...



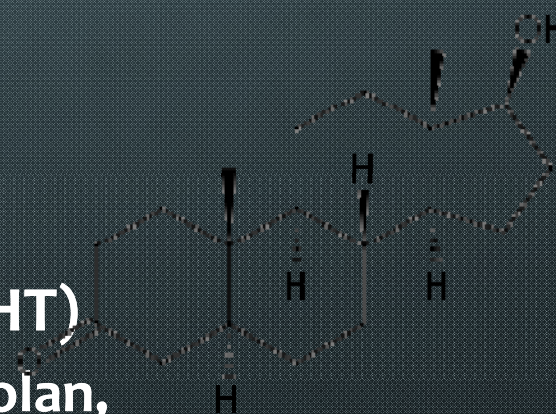
19-Nortestosterone Derived Steroids

Nandrolone, Durabolan, Trenbolone, Parabolan...



Dihydrotestosterone Derived Steroids (DHT)







Oxandrolone, Anadrol, Masteron, Primobolan, Winstrol...



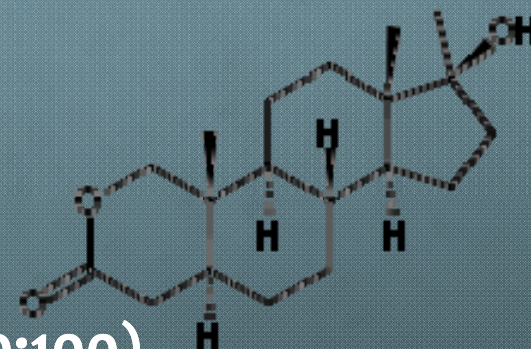
Background: Families of AAS

	Test	19-Nortest	DHT
• Anabolic Properties	• ++++++	• +++++	• +++++
• Androgenic Properties	• +++++	• +++++	• +
• Aromatization	• ++++++	• ++	• 0
• Virilizing Effects for Women	• ++++++	• 50/50	• 0
• Increase LDL, decrease HDL	• +++	• +	• 0
• Aggression	• +++++	• +++	• 0
• Lipolysis	• ++	• ++	• ++++++
• Bone Density, Joints, Con. Tissue	• +++	• ++++++	• +++
• Increase Metabolism	• +++++	• +++++	• +++
• Erectile Dysfunction	• ++	• ++++++	• +
• Maintain Gains Post-Cycle	• ++	• +++++	• ++++++
• Increase Red Blood Cells	• +++++	• ++	• ++
• Inhibition of HPTA	• +++	• ++++++	• +
• Male Pattern Hair Loss	• +++++	• ++	• 0
• Effects are Linear in Nature	• ++++++	• +++	• +
• Adverse Effects	• +++++	• +++	• +

Background: Ideal AAS

-  **Highly anabolic**
-  **Minimally androgenic**
-  **Safe oral form**
-  **Short acting (short half-life)**
-  **Low adverse effect profile**
-  **Long lasting results**

Background: Oxandrolone



- Anabolic/ Androgenic Ratio 500:25 (Test 100:100)
- Alpha-alkylated compound: it is very mild on the liver
- Non-aromatizing: no estrogen as byproduct
- Non-virilizing: safe for women
- Mild on HPTA: minimally decreases endogenous testosterone in males
- Great fat loss agent
- Great anabolic agent
- Detection time ~ 3 weeks

Literature Review:

- 228 papers published in the last 20 years (1992-2012)
- 55 results for Burn/Trauma Patient Care
- 45 results for Turner Syndrome
- 24 results for Halting Weight Loss
- 22 results for AIDS Related Wasting
- 10 results for Cancer
- 9 results for Wound Healing
- 6 results for Hepatitis
- 4 results for Angioedema
- 4 results for Muscular Dystrophy
- 3 results for COPD

Literature Review: Strong Evidence



Severe Burns

- 🌐 Most commonly used condition
- 🌐 Halts catabolism related with major stress
- 🌐 Non-age dependent
- 🌐 Small doses counteracts the effects of cortisol
- 🌐 Small doses (5mg-20mg per day) effective
- 🌐 Minimal adverse effects
- 🌐 Some evidence for improved tissue healing
- 🌐 Lean muscle preservation
- 🌐 Improved skin graft integrity in pediatric population

Literature Review: Strong Evidence

AIDS related wasting

- 🌐 Strongest evidence for use
- 🌐 Improves appetite
- 🌐 Various doses studied (5mg-80mg/day)
- 🌐 Halts muscle wasting immediately
- 🌐 Starts rebuilding lean muscle mass after 1-2 weeks
- 🌐 Strength gain
- 🌐 No studies conducted on eventual outcome
- 🌐 Effects long lasting even after cycle
- 🌐 Minimal adverse effects even at high doses

Literature Review: Moderate Evidence

Polytrauma

- 🌐 Evidence for halting catabolism associated with stress induced cortisol release
- 🌐 Lean muscle mass preservation noted
- 🌐 No benefit in Ventilator Days or LOS
- 🌐 No evidence proven for improved long term outcome



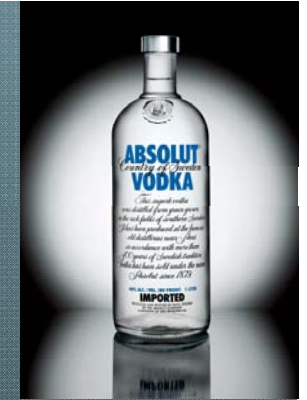
Literature Review: Moderate Evidence

Tissue healing

- 🌐 Strongest evidence from animal models
- 🌐 Some evidence from burn patient care
- 🌐 Improved wound healing in time and integrity
- 🌐 Anecdotal evidence from athletes: highly effective for tendonitis and other tendon/ligamentous injuries



Literature Review: Moderate Evidence



Alcoholic Hepatitis Induced Malnourishment

- 🌐 Moderate decrease of mortality when used in early/advanced liver disease
- 🌐 Severe/End stage: no change in mortality/morbidity
- 🌐 Low rate of adverse events despite alpha-alkylation
- 🌐 Best effects noted with patients able to consume > 2500kcal/day

Literature Review: Moderate Evidence

COPD-Associated Weight Loss

- Strong evidence for restoration of lost lean muscle mass (similar pattern as liver disease)
- Minimally improvement in mortality
- Moderate improvement in morbidity
- No significant improvement in PFTs
- Well tolerated for long term use in low-moderate doses
- No gender related adverse effects noted



Literature Review: Weak Evidence

ALS

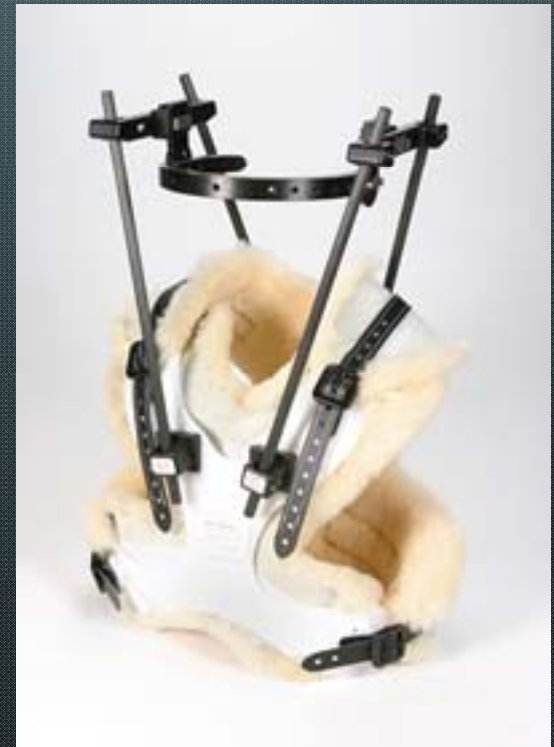
- 🌐 No significant improvement in eventual outcome
- 🌐 Some minor (non-statistically significant) improvement in lengthening ventilator free time period



Literature Review: Weak Evidence






Spinal Cord Injury

- 🌐 Animal models only
- 🌐 Minimal (non-statistically significant) improvement in motor and sensory function in rats
- 🌐 No human trials



Literature Review: Weak Evidence

Duchenne MD

-  High dose treatment yielded minimum slowing of muscle function deterioration when compared to placebo
-  Increased benefits noted in children vs. teenagers and young adults
-  No effect on outcome in general
-  No improvement of muscle function
-  No adverse effects noted

Health Canada's Position

Special Access Program

 Allows practitioners to request medications that are not available for sale in Canada

 IV Methadone

 Pentobarbital

 IV Rifampin

 Oxandrolone

 Nandrolone







 Arsenic

 Thalidomide








Prescribing

- 🌐 You need a pharmacist to aid you in the process
- 🌐 Exceedingly difficult to do it on your own
- 🌐 Special Access Program FORM A needs to be filled out and submitted to Health Canada, along with extensive literature review

The 'How to' Guide

-  Be informed about the medication/ condition
-  Have extensive reference list to back up your request
-  Demonstrate that there are no available medications that are comparable and readily available
-  Have patience
-  Have time to do the paperwork
-  Expect some hoops

Suggested Uses for Oxandrolone

-  Burn patients
-  AIDS related myopathy
-  Any chronic condition that is accompanied by a wasting/catabolic element
 -  COPD
 -  Hepatitis
 -  Malnourishment of any kind
-  Any acutely ill AAS user/abuser

**Questions?
Comments?
Suggestions?**

Thank You for your attention!