Dr Chris Ward
Manchester Royal Infirmary
Overheard at the gym: a clinician’s overview of interactions/toxicities of commonly used drugs:

**Non steroids**

Dr Chris Ward  
Consultant Genitourinary Medicine  
The Hathersage Centre, Manchester Royal Infirmary

Conflict of interests: none declared
Do you lift bro?
Aims and Objectives

• Why is going to the gym important?
• Bulking
• Cutting
• Strength and stamina
• Interactions
• Monitoring
Benefits of exercise

• Improves
  • Heart and lung endurance
  • Energy levels
  • Bone strength
  • Appetite
  • Sleep

• Reduces
  • Stress
  • LDL cholesterol/triglycerides
  • Lipodystrophy
  • Risk of Type II diabetes
Benefits of exercise

Moderate-Intensity Exercise Improves Body Composition and Physiological Markers of Stress in HIV-Infected Individuals

Effects of Combined Aerobic and Resistance Exercise on Exercise Capacity, Muscle Strength and Quality of Life in HIV-Infected Patients: A Systematic Review and Meta-Analysis

Physical Activity is Associated with Health and Everyday Functioning Among Persons with HIV Disease

Effect of Aerobic Exercise on CD4 Cell Count and Lipid Profile of HIV Infected Persons in North Eastern Nigeria
Why do people exercise?

1. Lose weight
2. Improve strength
3. Improve stamina and cardiovascular health
4. Reduce risk of long term health conditions
5. Aesthetics
Why do people exercise?

- Aesthetics
- Weight loss
- Sex/partner factors
- Social influence/validation
Bulking

• **Aim**
  - Gain Lean muscle
  - Minimise fat gain
  - Changes in food intake
  - Little aerobic exercise

• **Supplements**
  - Steroids
  - Whey proteins/BCAA
  - Creatine
  - Multivitamins
  - Testosterone
Bulking supplements

- Whey protein
  - Protein supplementation
  - Increases muscle growth

- BCAA
  - Essential amino acids
  - Improves post workout muscle recovery.

- Creatine
  - Glycine, methionine and arginine amino acids
  - Generates ATP
  - Greater power and strength
Renal considerations

Creatine degradation in muscles

Creatine phosphate

Creatine

Creatinine

Blood

Kidney

Urine

ATP

ADP

H₂O

Pi
Bulking supplements

- Multivitamins/ZMA
  - Reduces tiredness, fatigue and increase energy metabolism

- Essential fatty acids
  - Enhancing insulin sensitivity and improved metabolic profile

- Testosterone
  - Thought to improve performance, strength and muscle mass

- Steroid analogues
  - Improves protein synthesis, supporting lean muscle mass growth
What interaction needs to be considered?

1. Creatine and EFZ

2. ZMA and RAL

3. Omega 3 fatty acids and ABC

4. Testosterone and TDF

5. Winstrol (Stanozolol) and RPV
## Divalent cation interactions

<table>
<thead>
<tr>
<th>Potential Interaction</th>
<th>Dolutegravir</th>
<th>Magnesium</th>
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**Quality of Evidence:** Very Low

**Summary:**
Coadministration has not been studied. Dolutegravir may be subject to chelation by high concentrations of divalent cations which may result in reduced dolutegravir concentrations. Dolutegravir should be administered 2 hours before or 6 hours after taking medications containing magnesium.

**Description:**
Multivitamins should be taken well separated in time from the administration of dolutegravir (minimum 2 hours after or 6 hours before). Factors that decrease dolutegravir exposure should be avoided in the presence of integrase class resistance. This includes co-administration with medicinal products that reduce dolutegravir exposure (e.g. multivitamins).

**Tivicay Summary of Product Characteristics, ViiV Healthcare, January 2017.**

Simultaneous coadministration of a multivitamin preparation (One-A-Day) and dolutegravir (50 mg once daily) to 16 subjects decreased dolutegravir Cmax, AUC and Ctrough by 35%, 33% and 32%, respectively. Dolutegravir should be administered 2 hours before or 6 hours after taking medications containing polyvalent cations.

**Tivicay US Prescribing Information, ViiV Healthcare, June 2016.**
Cutting

• Aim
  • Reduce body fat
  • Maintain muscle definition
  • Reduce calorific intake
  • Increase anaerobic exercise/HIIT

• Supplements
  • Thermogenics
  • Glutamine
  • Glucosamine
  • Meal replacements
Cutting supplements

- Thermogenics
  - Fat burners or E/C/A stacks
  - Increases BMR

- Glutamine
  - Essential amino acid
  - Involved in protein synthesis and prevents muscle breakdown

- Glucosamine
  - Reduces development of OA
  - Used for joint support, no link to weight loss
Cutting supplements

- Meal replacements
  - Nutritionally balanced drinks
  - High protein
  - Low carbohydrate/fat
  - Used as substitute for a full meal
  - Effect on ARV absorption
Exercise side effects

• Side effects
  • DOMS
  • Heartburn/indigestion
  • Skin itching/jock itch
  • Urge to open bowels

• OTC remedies
  • NSAIDS
  • Antacids
  • Antihistamines
  • Antifungals
  • Anti-motility agents
What caution needs to be considered?

1. ABC and Diclofenac
2. ATV and Ranitidine
3. RPV and Cetirizine
4. RAL and Ketoconazole
5. MVC and Loperamide
**ATV interactions with Antacids/PPIs**

- **Reduced absorption**
  - ATV solubility decreases as pH increases
  - Reduced ATV concentrations if given with Ranitidine
  - Omeprazole decreases AUC of ATV by 75%
  - Both PPIs and Antacids should be avoided
Summary and top tips

• Safety – what is it they are actually taking?

• Timings – practical advice around spacing

• Interactions – absorption, metabolism and excreting

• Monitoring – stop it and see
Any questions?

The only thing harder than Leg Day is not talking about it