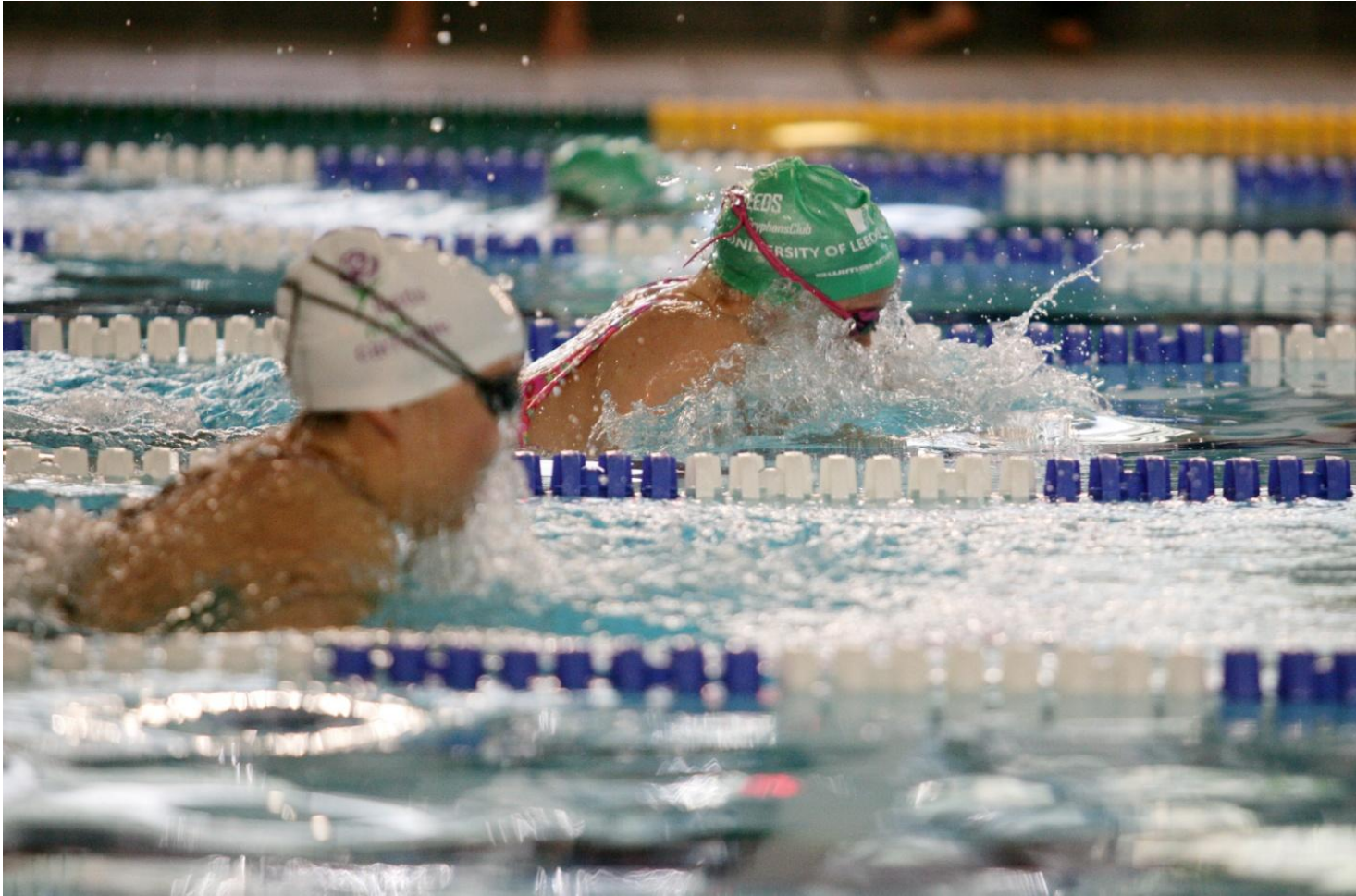


Drug Testing Laboratory



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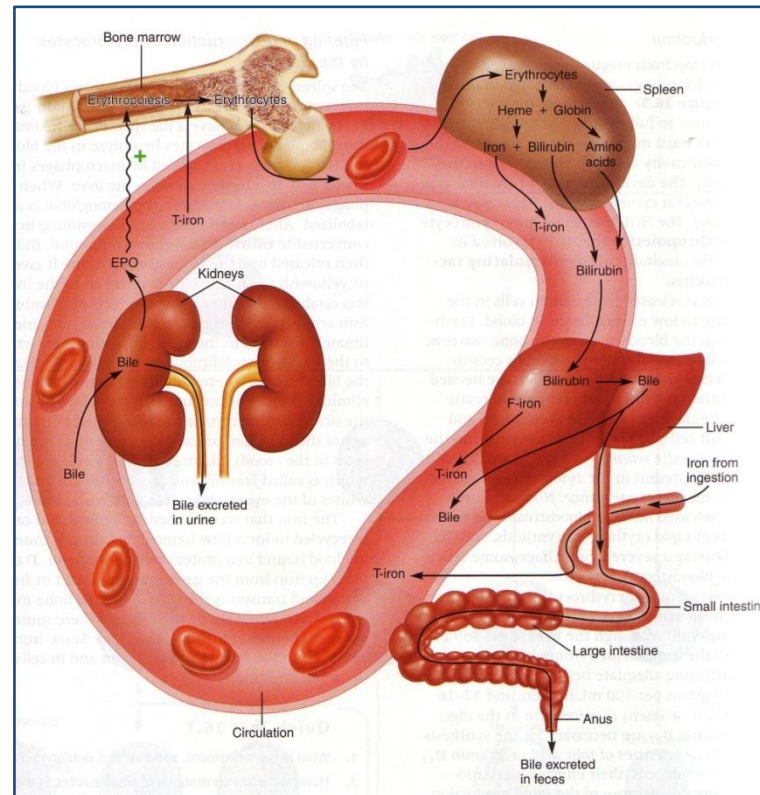
This work is licensed under the Creative Commons Attribution-NonCommercial 3.0 Unported License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/3.0/> or send a letter to Creative Commons, 444 Castro Street, Suite 900, Mountain View, California, 94041, USA.

WADA Guidelines

- The World-Anti Doping Agency (WADA) code was introduced in January 2004 and updated in 2009
- The WADA established a routine of testing athletes for banned substances both in and out of competition

Erythropoietin (EPO)

- EPO is a naturally occurring hormone
- EPO controls **erythropoiesis**, a process involved in the production of red blood cells



Red Blood Cells (RBC) in Exercise

- RBCs play a key role in exercise
- RBCs transport oxygen from the lungs to the working muscles
- An increased RBC count can be beneficial in sports which require high levels of aerobic fitness (cycling, long distance running and rowing)
- Increased production of RBCs is a process called **erythropoiesis**

Erythropoiesis can be enhanced by supplementing with synthetic erythropoietin (EPO)

Drug testing laboratory scenario

- This is a mock WADA drug testing laboratory
- You are given 4 urine samples from athletes post competition
- Your job is determine who maybe using the drug **Erythropoietin** which is on the WADA banned list

Health & Safety in the laboratory

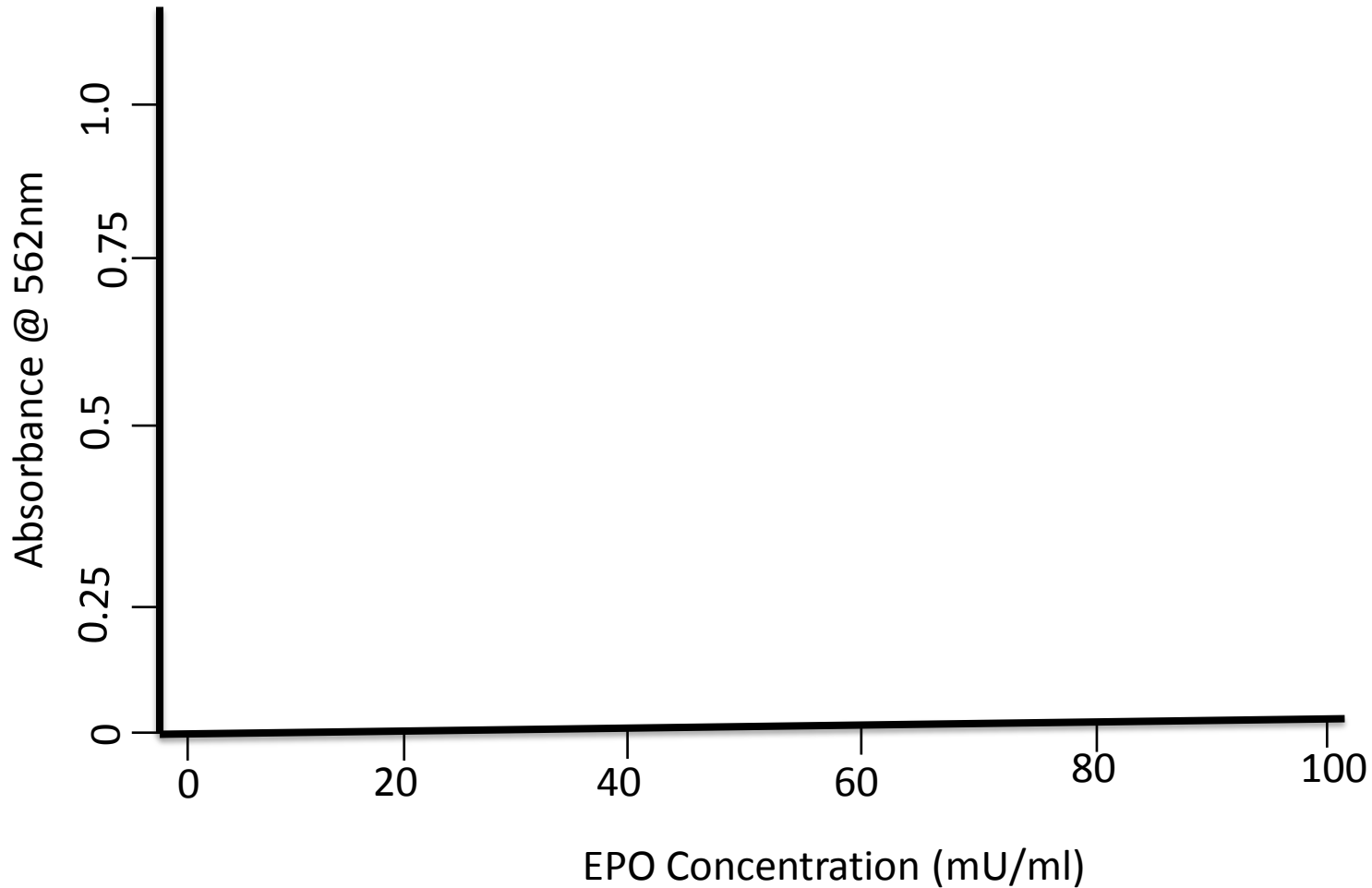
- Gloves
- Lab coats
- No eating & drinking

Using a Gilson Pipette



- Choice of pipette
 - button top, maximum volume it measures in μl . Use smallest
- Put on tip.
- To draw up the reagent
 - push button to **1st** stop (gently)
 - insert tip into reagent
 - slowly release button
- To expel reagent
 - depress button slowly, **2nd** stop

Constructing a calibration curve



Analysing your results

- Normal values of EPO: 1-19 (24) mU/ml

Define your samples as high, borderline, low or negative

Do you think any of your athletes have taken EPO?

- Abdul
- Tom
- Ann
- Mary

Results

Athlete	Concentration of EPO in sample	Define as high, borderline, low or negative
Tom	10	Negative-low
Abdul	20	Negative-high
Ann	40	borderline
Mary	80	high

Discussion

Are there any alternative explanations?

- Altitude training?
- Masking agents?
- False samples?

Case Studies

- Skier Eero Mäntyranta
- Triathlete Rutger Beke

Guilty athletes... only to be proven innocent

- **Mäntyranta**-physiological testing showed that he had a **genetic mutation** of his EPO receptor gene which caused EPO to be more effective
- **Beke**- proved that his sample had been contaminated by **bacteria** which caused it to appear that he had excessive levels of EPO

***Any questions, comments or
final thoughts?***