Testosterone

- i.e the male hormone
- Produced by the testes

Regulated by the brain
Pubertal Development

• Brain signals pubertal timing

![Graph showing testosterone levels across Puberty and Adulthood]

- Mini-puberty (2-3mon)
- Childhood
- Puberty and Adulthood
What does testosterone do?

• Secondary Characteristics
  • Increases acne, body odor, secondary hair *
  • Deepens the Voice
  • Prominence of the Adams Apple
  • Shoulder broadening
    • Together with the increase in muscle mass helps decrease gynecomastia
  • Enlargement of the testes and penis
  • Sperm production
  • Libido

*the adrenal glands also contribute to these changes
What does testosterone do?

• Helps with Growth
What does testosterone do?

- Works with growth hormone and in conjunction provides the growth spurt
What does testosterone do?

- Promotes strength
  - Increases lean body mass
  - Exercise leads to muscle development
  - Again, works together with growth hormone
- In older men, lower levels of testosterone impacted sustained muscle strength (grip strength but not activity such as walking)
What does testosterone do?

- **Bone Health**
  - Together with growth hormones and muscle mass provides bone strength
  - The differences start at puberty
    - Growth factors
    - Sex steroids
    - Exercise

![Diagram showing relationships between IGF1, mechanical loading, sex steroids, and testosterone](image)
What does testosterone do?

• Bone Health
  • Impacts bone shape
  • Bone is an active organ
What does testosterone do?

• Bone shape during adolescence influences adult risk for fracture
What does testosterone do?

- Body fat distribution is different between males and females
What does testosterone do?

- Needed for production of erythropoietin in the blood
- Helps make red blood cells
- Keeps you from becoming anemic
- Anemia can lead to decreased energy
What does testosterone do?

- The type of fat is also different between males and females
- Males have more fat around organs and less around the abdomen and buttock/thigh areas
- Store less fat centrally
- Upper body fat is more easily used
What does testosterone do?

• There are metabolic effects too.
• The fat around organs has been associated with increased risks for diabetes and cardiovascular disease. Testosterone can help with break down of fat.
• Testosterone improves the muscles use of insulin and lowers risk for diabetes.
  • Increased testosterone means more muscle mass
  • More muscle mass means better use of insulin
• It also prevents pluripotent stem cells to become fat cells.
How is testosterone supplemented?

- Injection
  - Subcutaneous vs Intramuscular
- Gel (packets or tube)
- Deodorant
- Patch
- Foam
- Pellet
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Check with your doctor and insurance before switching!