

# *Regulation of Lipid Catabolism*

Biochemistry: A Short Course available in reserve<sup>1</sup>.

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### *Learning Objectives*

- Explain how triglyceride breakdown into glycerol and free fatty acids is controlled in adipocytes by hormonal signals.
- Explain how high carbohydrate diets affect fuel utilization, including effects on lipid fuel utilization. Describe at an endocrine level how this is thought to occur.
- Determine how much energy, in ATP equivalents, is released during the oxidation of a given fatty acid. Be able to relate the energy content of a fatty acid, in general to its physical properties (length and saturation).
- Explain the rate limiting steps of lipid oxidation.
- Explain how ketone bodies are converted to ATP in non-hepatic tissues, and what governs this specificity.
- Demonstrate an understanding of how *de novo* lipogenesis and  $\beta$ -oxidation are reciprocally controlled.
- Describe how very long chain fatty acids are oxidized differently from long chain fatty acids.
- Explain how odd-numbered fatty acids are catabolized, including the importance of vitamin B12 in this process.
- Evaluate the role of transcriptional regulation and long term adaptations to fatty acid oxidative capacity.

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IN TERMS OF ATHLETIC PERFORMANCE, increasing the ability to oxidize fatty acids is important for endurance athletes.