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Abnormal metabolism is at the heart of some serious health problems (such as obesity, diabetes and cancer), which not only reduce our life expectancy, but are also a great cost to society. This Insight offers a snapshot of the molecular mechanisms that underlie metabolism and its associated pathology, and showcases the progress made in this buoyant area of research.

Metabolism beats to a drum of about 24 hours. In his Review, Joseph Bass shows how breakthroughs in our understanding of circadian rhythms and molecular clocks bring insight to the molecular pathogenesis of metabolic disorders.

Although direct actions of hormones, such as insulin, regulate nutrient handling in peripheral tissues, the central nervous system also plays a significant part in metabolic regulation. From specific signalling mechanisms to hypothalamic circuitry, Martin Myers and David Olson discuss how the brain controls metabolism.

Cancer cells thrive by switching to a different metabolic program. The mechanistic basis for these changes and how they are connected to oncogenic pathways is becoming increasingly understood. Almut Schulze and Adrian Harris discuss these advances, and explore strategies that interfere with these metabolic pathways for use as anticancer therapies.

Much of our understanding of mitochondria has come from studying rare mitochondrial disorders. Scott Vafai and Vamsi Mootha review what we have learned from these diseases by putting them in the context of a contemporary understanding of mitochondrial evolution, biochemistry and genetics.

Finally, Jeremy Nicholson and colleagues discuss how metabolic phenotyping, which involves a comprehensive analysis of biological fluids or tissue samples, can facilitate the biochemical classification of individual physiological or pathological states. This approach is currently being used in clinical practice to assist with disease diagnosis, prognosis and treatment selection for individual patients and to estimate disease risks at the population level.

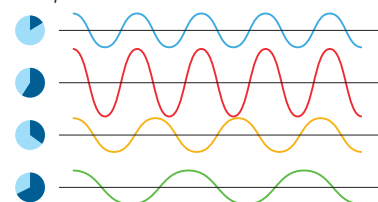
**Joshua Finkelstein, Noah Gray,
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CONTENTS

REVIEWS

348 Circadian topology of metabolism

Joseph Bass



357 Central nervous system control of metabolism

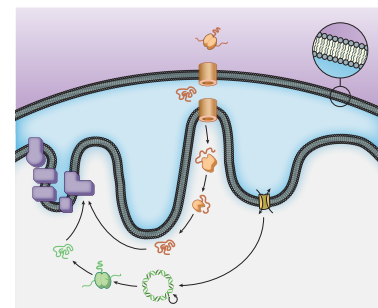
Martin G. Myers Jr & David P. Olson

364 How cancer metabolism is tuned for proliferation and vulnerable to disruption

Almut Schulze & Adrian L. Harris

374 Mitochondrial disorders as windows into an ancient organelle

Scott B. Vafai & Vamsi K. Mootha



384 Metabolic phenotyping in clinical and surgical environments

Jeremy K. Nicholson, Elaine

Holmes, James M. Kinross, Ara W.

Darzi, Zoltan Takats & John C. Lindon

