

Clinical Detective Stories:

A Problem-Based Approach to Clinical Cases in Energy and Acid-Base Metabolism

Mitchell L Halperin, University of Toronto and Francis S Rolleston, Medical Research Council, Ottawa.

Not just another biochemistry textbook, but a new concept in student learning...

This book is written for students who want to apply fundamental concepts of energy and acid-base metabolism to clinical problems. It uses more than 50 clinical cases, with data obtained in the hospital setting to introduce each set of concepts, and to provide the basis for discussion of the needed biochemistry and physiology. Questions and commentary drawn from human and veterinary medicine provide a broad scope for understanding the concepts presented; details of metabolism are presented only when they are necessary to an understanding of clinical medicine.

Another strength of this book, and one which makes it unique, is its broad base — the subject matter integrates energy metabolism together with renal, acid-base, endocrine and gastrointestinal physiology so that decisions about clinical cases can be made on a more rational basis.

Contents: Energy and Acid-Base Physiology: Energy metabolism: fuels, organs, pathways and controls: Acid-base metabolism: production and

excretion of wastes; Clinical Applications: Energy metabolism in exercise; Diabetes melitus; Hypoglycemia; Metabolic acidosis; Metabolic Function and Control: Introduction to metabolic pathways and control mechanism; The carbohydrate system; The pyruvate dehydrogenase system; The ATP generation system; The fat system; The protein system; Discussion of Questions; Structure and Pathways.

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300 pages March 1993

Case 1.3

Confusion in a Marathon Runner



Jon entered the stadium for the final lap of his marathon race. He was well ahead of his competitors. In the last few minutes, he became confused. In the stadium, he started running around the track in the wrong direction and then collapsed. What went wrong?

Discussion of Case 1.3

Confusion in a Marathon Runner



During strenuous exercise, the brain and muscle compete for glucose. Although the brain can use either glucose or ketoacids for its energy needs, ketoacids were not available because Jon had not been deficient in carbohydrates long enough. Hence, his brain could use only glucose. Muscle, on the other hand, can use fatty acids, muscle glycogen, or circulating glucose for energy. Because fatty acids are insoluble in water, they cannot be delivered to muscle at a sufficiently rapid rate. Thus, muscle will use glycogen and glucose when the demand for fuels is high.

The marathon run consumed glycogen, the reserve of glucose in Jon's body. Pushing himself to the limit at the end of the race caused a sudden depletion of glucose in his blood, starving his brain of its only source of energy. Without fuel, his brain malfunctioned.

to conceptualize in a physiologically meaningful way the metabolic and acid base problems with which they deal on the wards."

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Clinical and Investigative Medicine



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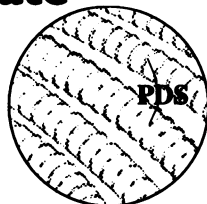
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