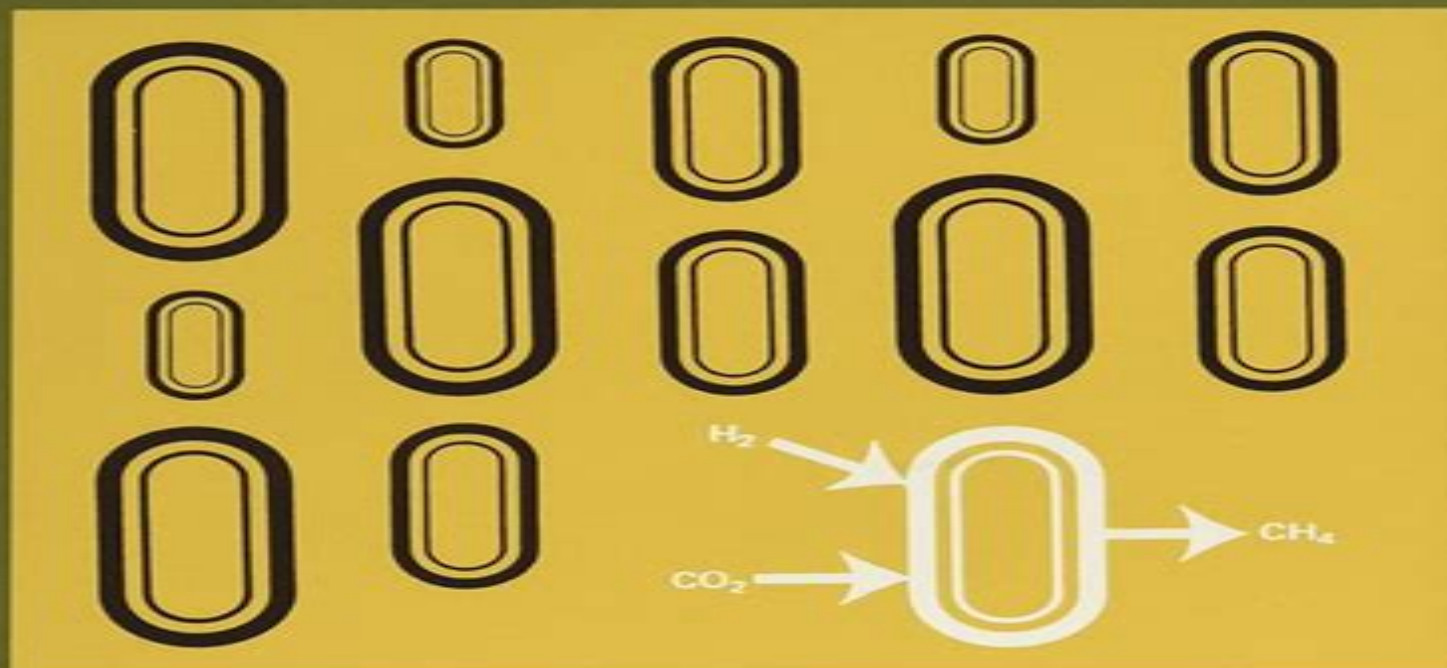




GERHARD GOTTSCHALK

Bacterial Metabolism

Second Edition



Springer

Bacterial Metabolism Springer Series In Microbiology

G. Gottschalk



Bacterial Metabolism Springer Series In Microbiology:

Bacterial Metabolism Gerhard Gottschalk, 1986 I am particularly indebted to Joan Macy Lynne Quandt Jan Andreesen and Peter Hillmer for reading the manuscript for their criticisms and their suggestions and I thank Ute Gnass for typing the manuscript and for her invaluable help with the indexing and with the preparation of the figures Finally I am grateful to the publishers for their patience willing help and cooperation Göttingen 1978 GERHARD GOTTSCHALK Contents CHAPTER I Nutrition of Bacteria I Major and Minor Bioelements I II The Two Basic Mechanisms of ATP Synthesis 4 III Nutrients as Energy Sources 6 IV Growth Factor Requirements of Bacteria 9 V Summary 10 CHAPTER 2 How Escherichia coli Synthesizes ATP during Aerobic Growth on Glucose I Transport of D Glucose into the E coli Cell 13 II Degradation of Glucose 6 Phosphate to Pyruvate via the Embden Meyerhof Parnas EMP Pathway 15 III Oxidative Decarboxylation of Pyruvate to Acetyl Coenzyme A 18 IV Oxidation of Acetyl CoA via the Tricarboxylic Acid Cycle 20 V The Formation of ATP in the Respiratory Chain 22 VI Summary 35 CHAPTER 3 Biosynthesis of Escherichia coli Cells from Glucose I Composition of E coli Cells 38 II Assimilation of Ammonia 40 III Assimilatory Reduction of Sulfate 42 IV Biosynthesis of Amino Acids 43 V How Pentose Phosphates and NADPH are Formed 55 xii Contents VI Ribonucleotides and Deoxyribonucleotides 59 VII Biosynthesis of Lipids 65 VIII Formation of Carbohydrates 71 IX Synthesis of Polymers 73 X The Requirement for an Anaplerotic Sequence 92 XI

Bacterial Metabolism G. Gottschalk, 2012-12-06 This book has been written for students who are taking a course in bacterial metabolism I hope however that scholars will also find it useful either as a help in teaching bacterial metabolism or as a review on the special aspects of metabolism in bacteria The concept of this book results from my experience in teaching bacterial metabolism In the first chapters the principal reactions of the energy and biosynthetic metabolism have been discussed using Escherichia coli as a model organism Then the diversity of aerobic metabolism has been outlined Following a brief description of the regulation of the level and the activity of enzymes in bacteria the characteristic features of fermentative chemolithotrophic and phototrophic metabolism have been discussed Finally the last chapter has been devoted to nitrogen fixation Throughout the text I have tried not only to describe metabolic pathways and enzyme reactions but also to elucidate the physiology of the microorganisms which carry out all these metabolic reactions Two comments regarding the formulas used in this book are necessary [National Library of Medicine Current Catalog](#) National Library of Medicine

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