

BROCK BIOLOGY OF MICROORGANISMS

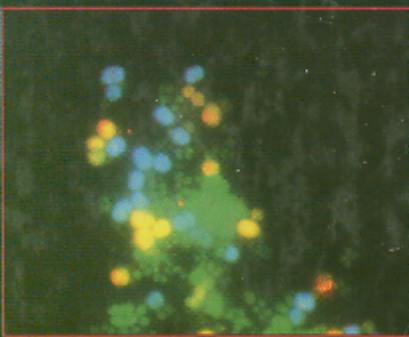
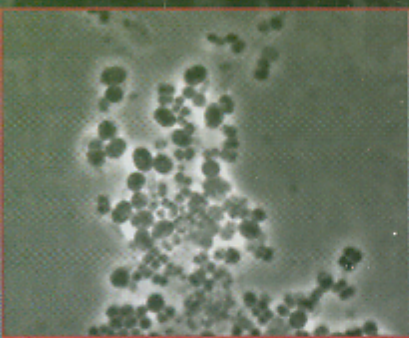
MADIGAN

MARTINKO

PARKER

TENTH EDITION

About the Cover and the Book

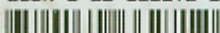


In microbiology, as for life in general, things are not always as they seem. On the front cover and shown again at left are photomicrographs from an actual research article. The two photos depict the same microscopic field of bacterial cells in a sample of activated sludge from a sewage treatment plant; cells in the top panel were photographed by phase-contrast microscopy (a form of light microscopy), while those in the bottom panel were stained and photographed by fluorescence microscopy. The fluorescent dyes used to stain the cells were attached to nucleic acid probes designed to hybridize to complementary nucleic acid sequences in the RNA of the cells' ribosomes. However, each dye (green, blue, and yellow) was attached to its own unique probe, allowing each of the different colored probes to target a particular subset of cells in the microbial community. As shown in the fluorescent micrograph, the green probe labeled a small bacterium that formed cell clusters while the blue and yellow probes revealed that the large ovoid cells, virtually indistinguishable by phase-contrast microscopy, actually consisted of two genetically distinct populations. Using this suite of

probes the researchers were able to conclude that at least three different populations of cells were involved in degradation of the sludge.

Molecular probes such as those shown here have opened up new avenues of research in microbial ecology, allowing microbiologists to continue to use their oldest tool, the microscope, but in new and exciting ways to ask sophisticated questions about the composition of natural communities of microorganisms. The tenth edition of *Brock Biology of Microorganisms* covers these and many other new developments in microbial ecology, along with the basic principles of microbiology, molecular biology, microbial diversity and genomics, and medical microbiology, in an exciting and readable way. The tenth edition also debuts a new direction for the organization and presentation of material in *Brock Biology of Microorganisms*. The book is organized around six thematic units that allows instructors of introductory microbiology courses to cover the fundamental principles (Unit 1), and then build the remainder of their course around other units or chapters within units as they see fit. This new approach to the teaching of microbiology retains the best of the previous editions of this textbook in a flexible pedagogical format fit for the new millennium.

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