or for recovering mutant alleles by homologous recombination, nor do any of the experiments exploit the increasingly widely-used nmt regulatable promoter. In short, as both a general fission yeast lab manual or as a start-up guide, the book falls some way short of expectations. *Caveat emptor.*

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Microbial Cell–Cell Interactions. Edited by MARTIN DWORKIN. American Society For Microbiology, Washington D.C. 1991. 374 pages Hardback. Price $69.00. ISBN 1 55581 037 3.

This book contains a collection of extremely diverse articles on inter-cellular interactions in various microorganisms – bacteria, yeasts, algae, etc. In his introduction the editor, M. Dworkin, points out that microbiologists are usually inclined to restrict their studies to the unicellular features of their chosen organisms, which are conceived as if they were living in an isolated, strictly unicellular, world. In reality, many of them are continuously exposed to signals emanating from other microorganisms, belonging to the same or different species. In particular the vast majority of bacteria live in dense associations, such as biofilms, surface colonies etc. and cannot escape what Dworkin calls 'horizontal' control from their neighbouring cells.

There are many examples of this kind of control, whereby signals pass from one cell to another, and influence the behaviour of the recipient cells. One such example is that of the mating pheromones, soluble substances secreted by cells of one mating type, and inducing mating behaviour in another. Mating in bacteria was first discovered, to our great surprise, by J. Lederberg and E. L. Tatum in 1947, and since then an immense amount of detail, far too much to go into a single chapter of a book like this, has been revealed. Similarly in yeast the process of sexual conjugation is now known to involve an incredibly complicated system of interactions between different cells. These interactions are very different in different groups of microorganism, showing that universal biological phenomena like sexual fusion may be controlled in many different ways.

Apart from mating, microbes may associate in groups for other purposes, such as the formation of colonies, symbiotic combinations or predator–prey interactions. So the book is very heterogeneous in regard to the organisms treated, in the phenomena discussed, and in the amount of detail available for each example. The unsuspecting reader will be surprised to find one chapter devoted to a subject ordinarily discussed only when one visits the dentist, namely the formation of layer upon layer of different species of bacteria in the plaques on our teeth. These bacteria, it seems, must also be subjected to some kind of cell–cell interaction. The last chapter is devoted to a remarkable bacterium called *Bdellovibrio*, which invades other bacteria and passes through various developmental stages there, killing its host. All this involves an exchange of signals between predator and prey, but the nature of these signals, in this case, is largely unknown.

Wide though the range of topics and organisms is, the reviewer was sorry to find so little attention being given to the ciliate protozoa, in which the concept of mating type, in *Paramecium*, was first put forward by T. M. Sonneborn in 1937, and in which so much important work on mating-inducing pheromones, in *Euplotes*, has been discovered recently. Obviously, this is an enormous subject, only the surface of which is scratched by the articles in this book. However, one must applaud the initiative of the author in selecting and publishing these articles, which will undoubtedly arouse interest among a wide circle of biologists.

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