



Foundations in Microbiology

About the Cover Image

The microscopic world offers glimpses of striking complexity and intricate beauty that rival any seen with the naked eye. At first glance, the image on the cover might mimic an exotic flower, but its loveliness hides a deadly little secret. It is a highly magnified view of the protozoan parasite *Trypanosoma brucei*, the cause of African trypanosomiasis, or sleeping sickness. This severe, often fatal, disease is acquired through the bite of a tsetse fly. The disease occurs primarily in sub-Saharan Africa at a rate of about 500,000 human cases a year, and it causes considerable harm to the livestock and native wild animals of the region as well.

The delicate ruffles typical of the cell's appearance have actually been enhanced through experiments in the laboratory of Dr. Keith Gull and Dr. Samantha Griffiths of the Sir William Dunn School of Pathology in Oxford, England. By manipulating the parasite's genetic material, they

caused it to make multiple copies of its locomotor appendage, the flagellum. In this image, the flagella can be seen as the wavy strands that wrap around the body of the trypanosome like a shawl. Ordinarily, there is only a single flagellum on each cell, and it is essential for movement, cell division, and survival. The genetic disruption induced by the treatment will ultimately prevent the cell from dividing and will lead to its demise. Researchers in Dr. Gull's lab are studying this mechanism as a possible basis for desperately needed new drug treatments.

This microbe is only one of many thousands—pathogens and non-pathogens alike—that are continuing to yield surprising clues about basic life processes. The chronicle of *Trypanosoma brucei* and its disease is just one example of the significant connections between microbes and humans that you'll read about in this text. The world of microbiology touches us all in profound ways.

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