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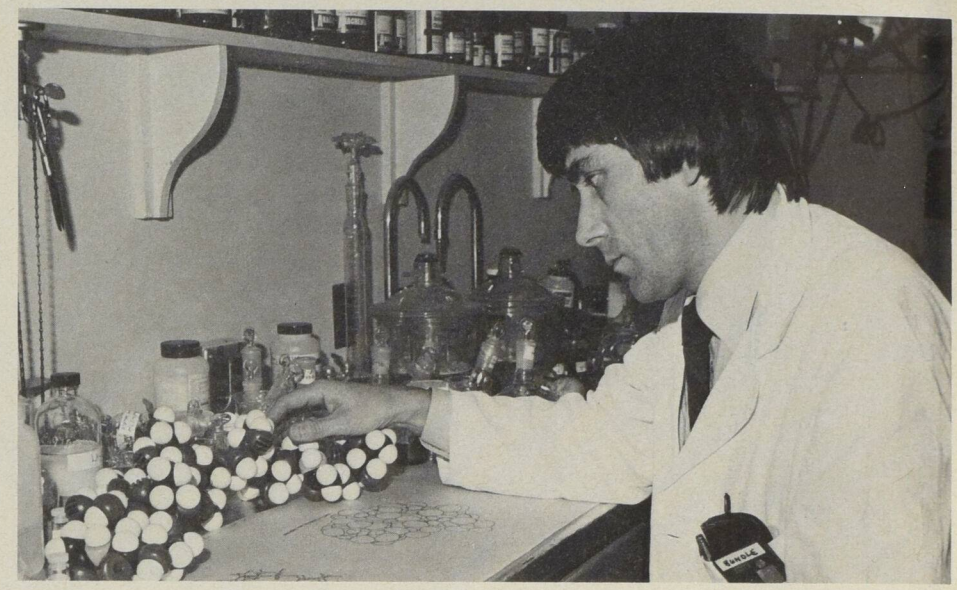
Cancer versus cancer



NRC's Dr. David Bundle: taking advantage of cancer cells to produce substances of value. *(Dan Getz)*

Le Dr David Bundle, du CNRC. La capacité des cellules cancéreuses de produire des substances de grande valeur est mise à profit. *(Dan Getz)*

Of all the unusual twists that scientific research has taken in its short, dramatic history, hitch-hiking on cancer cells to produce life-saving molecules has to be the most bizarre. In the last few years, NRC chemist Dr. David Bundle has used a method developed in Britain during the mid-'70's to generate antibodies by harnessing the cells which produce them to cancer's seemingly endless ability to proliferate.

Antibodies, the crab-like protein molecules that serve as the shock troops of the immunological defence system, arise when the body is invaded by microorganisms. Special lymphocyte cells recognize foreign structures on the invader's surface called "antigens", and clones of lymphocytes in the blood are produced that churn out antibodies; these molecules complex very specifically with the surface antigen, leading ultimately to destruction of the invader.

What makes antibodies so special is their ability to target on or recognize a single antigenic structure, and it is this selectivity that makes them valuable to researchers. Vanishingly small amounts can be used to detect and identify bacteria, to assay enzymes and proteins used in medical drug therapies and research, and to type the large variety of antigen structures that underlie human blood group types.

As Bundle explains it, the problem with traditional methods of producing antibodies (which involve injecting animals with an antigen, then waiting for the animal's defences to raise a repertoire of lymphocyte cells producing antibodies against it) is the paucity of material produced. "The lymphocytes simply don't produce enough antibody," he explains, "and it is usually a population of different antibodies. Equally important, however, the cells don't survive very long when cultured in the laboratory.

"When a lymphocyte with the antibody you want is fused to a cancerous type of lymphocyte called a myeloma (from certain human leukemias) the resulting 'hybridoma' not only confines itself to the production of that antibody, but it does so endlessly. Lots of this 'monoclonal' antibody is produced, and it's pure."

Bundle, a chemist versed in the synthesis of carbohydrate antigens, particularly those found on bacterial cell walls, hopes to use the hybridoma technique to study the way these carbohydrates are arrayed on bacteria, and ultimately to use the information against them. Another goal, and one shared by several labs, is to look into the manner by which cancer cells home in on target tissues during their spread through the body (metastasis). It is hoped that antibodies can be used either to block such a deadly connection, or to disrupt the cancer cells. In the long run, the hybridoma may be science's long sought "magic bullet" in the fight against disease. □

Wayne Campbell