

**THE THORN IN
THE STARFISH:
The Immune System
and How It Works**
by Robert S. Desowitz
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In 1882, Elie Metchnikoff, an eccentric Russian zoologist, observed that thorns placed "under the skin of beautiful starfish larvae" were attacked by certain cells. These attackers he called "phagocytes," derived from the Greek word *phagein*, to eat. Thus began immunology: the study of how the body fights disease.

Phagocytes, explains Desowitz, a noted parasitologist, are the first of the immune system's three lines of defense.

Second are antibodies, substances that combine with specific toxins or microbes to neutralize them. To make antibodies, the body uses two types of lymphocytes, white blood cells with round nuclei. T-cells from the thymus recognize antigens (foreign invaders), while B-cells (possibly created in bone marrow) prompt production of the correct antibodies to fight them. An immunity has been "built up" when lymphocytes "remember" earlier antibody-antigen battles and spring into action against an invader.

The third defense is the complement system, nine major proteins in blood serum that kill antigens and assist the antibodies.

Nature provides other avenues of protection. When—after being fed—people in famine-stricken Somalia became ill with malaria, tuberculosis, and brucellosis, researchers traced the phenomenon to lactoferrin, a protein that consumes iron. As long as food was scarce, the protein got all the iron and the disease-causing bacteria starved. But when Somalis were given food, there was enough iron for both lactoferrin and the bacteria; the protein no longer offered protection.

Other matters addressed by Desowitz: AIDS, and why smoking suppresses the immune system but lessens the suffering of some asthmatics.
