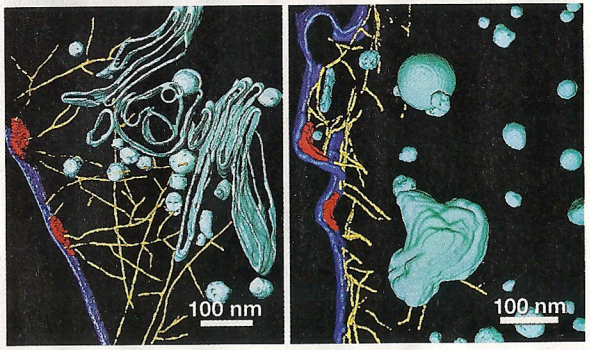
NEW LIGHT ON MALARIA MYSTERY

IMAGING: How sickle cell anemia mutation thwarts malaria parasite comes into focus

THE MUTATION that causes sickle cell anemia also prevents severe malaria, and researchers may have finally figured out why: The genetic tweak stymies the malaria parasite's attempt to hijack transport machinery inside red blood cells (*Science*, DOI: 10.1126/science.1213775). The discovery could lead to new targets for malaria treatments.

SCIENCE/AAAS



In computer renderings of electron microscope data, a normal blood cell with malaria (left) contains an actin network (gold) to ferry vesicles (turquoise) and adhesive proteins (red) to the cell membrane (blue). Malaria-infected cells with the sickle trait (right) have a disrupted network.

In the 1940s, doctors noticed that patients with sickle cell anemia were more likely to survive a bout with malaria, but they were unable to find an explanation. Subsequent research revealed the parasite places sticky protein knobs on red blood cell membranes to avoid detection and expulsion. In people with certain hemoglobin defects, including the sickle cell trait, the knobs end up sparsely and improperly placed, but no one knew why, says Michael Lanzer of Heidelberg University, in Germany. His team used cryoelectron tomography to better define the machinery that's involved in knob placement.

Many groups have tried to visualize this machinery, Lanzer says, "but they couldn't define it in all its intricate detail because everyone was using cells preserved by chemical fixation," which degrades delicate proteins. Thanks to recently developed low-temperature preservation techniques, Lanzer's team learned that the parasite mines the cytoskeletal protein actin from red blood cells. With this actin, the parasite builds highways to ferry adhesive proteins and other essentials. But in red blood cells with the sickle mutation, the parasite is unable to use actin to properly place its knobs.

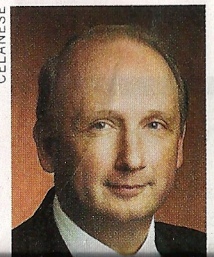
On the basis of results from a test-tube assay, Lanzer's team proposes that oxidized forms of hemoglobin common in the sickle mutation interfere with actin polymerization, thwarting construction of the malaria superhighway. His team now plans to verify those results in red blood cells.

Leann Tilley, who studies malaria at the University of Melbourne, in Australia, praised the work, noting that follow-up studies have the potential to reveal parasite proteins that are responsible for hijacking actin. "These proteins may be enzymes that could be targeted with drugs," she says.—CARMEN DRAHL

CELANESE'S LEADER TO STEP DOWN

EXECUTIVE CHANGE: Albemarle Chairman Mark Rohr will take the reins at Celanese in 2012

CELANESE



DAVID N. WEIDMAN, the man who took acetyl

"If you are going to lose a CEO to retirement, you couldn't do better than Mark Rohr" as a replacement, says Charles Neivert, a managing director and analyst at investment banking firm Dahlman Rose & Co. Neivert says he expects that, with Rohr leading the firm, Celanese will have the same financial discipline and conservative management it has had with Weidman.

Weidman, a chemical engineer with an M.B.A. from the University of Michigan, joined Celanese in 2000, shortly after the firm was spun off from Hoechst. He became CEO in 2004 during a financially trying period