



Since we have no choice but to be swept along by [this] vast technological surge, we might as well learn to surf.

**Michael Soule**  
*Conservation for the 21st Century*  
(D. Western and M.C. Pearl)  
1989

## Forum

### Rethinking Thalidomide

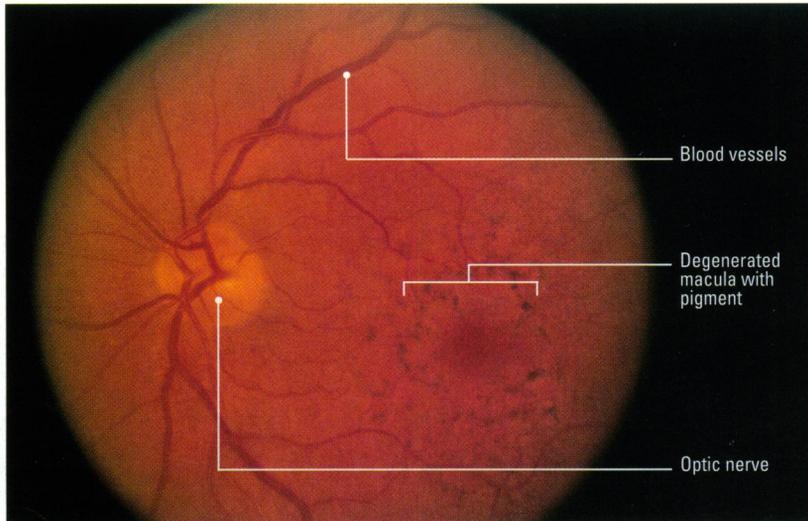
New research indicates that the controversial drug thalidomide, which caused severe birth deformities when taken as a sedative and hypnotic by pregnant women in the 1960s, may be useful in treating diseases that cause blindness.

Robert D'Amato, a researcher at the Children's Hospital at Harvard Medical School, came across thalidomide while searching for drugs to treat two diseases that cause blindness, macular degeneration and diabetic retinopathy. Both diseases cause excess growth of blood vessels which burst in the eye and destroy vision.

D'Amato, an ophthalmologist with a Ph.D. in neuroscience, said that in looking for a drug that stops blood vessel growth, or an angiogenesis inhibitor, he realized such a drug would have left a trail of clues. It occurred to him that an angiogenesis inhibitor would cause menstrual periods to stop, as well as cause birth defects. He conducted a medical literature search for drugs that caused these side effects, and hit upon thalidomide. "Thalidomide was one drug that fit the profile, because it had the appropriate side effects for an angiogenesis inhibitor," he said.

D'Amato theorized that the reason thalidomide causes birth defects is that it acts during angiogenesis to affect blood vessels of fetuses. He said that for 30 years, scientists had been trying to figure out how thalidomide affects fetuses, but no one had studied blood vessels. It has only been in the last 10 years that scientists have been able to grow blood vessels in cultures to study them. D'Amato set out to prove that thalidomide is indeed an angiogenesis inhibitor, and as such may present a possible treatment for macular degeneration and diabetic retinopathy.

Diabetic retinopathy results from high blood sugar levels that lead to a scarcity of blood in the retina. To compensate, the



Children's Hospital, Boston, MA.

**Eyes on thalidomide.** New research suggests the drug may be used to treat diseases such as macular degeneration.

retina produces factors that encourage blood vessels to grow into a tangled mass, interfering with vision. The disease can be treated with lasers, which burn away the excess vessels, but only if the vessels haven't reached the retina.

Macular degeneration, which mostly affects people over the age of 65, results from a blood vessel growing under the macula, the center of the retina, that blocks vision. Some cases can be alleviated by treating the blood vessel from the side with a laser, but the process still affects vision.

D'Amato teamed up with Michael Loughnan, an Australian ophthalmologist, to test thalidomide on rabbits. They surgically implanted a substance that encourages blood-vessel growth in a pocket of the rabbits' corneas, causing a stream of vessels to grow across the cornea. The researchers then administered thalidomide and various compounds of thalidomide orally, to see if any of the drugs could halt the blood-vessel growth. The only successful compounds were the ones that inhibited blood vessel growth and caused birth defects, thus supporting D'Amato's theory. D'Amato said that thalidomide alone worked the best to halt blood vessel growth. The eyes of the rabbits that were given thalidomide had only a scattering of blood vessels around the growth pocket.

Since this discovery in December

1992, the researchers have conducted tests on mice and found similar results. The FDA granted D'Amato approval for clinical trials to begin in January 1995. The researchers will test men and postmenopausal women with macular degeneration. D'Amato said results will not be seen for at least a year. If the tests prove successful, however, a widespread treatment for macular degeneration would most likely be available around January 1996.

And, if the tests go well, the researchers would then begin testing thalidomide for treatment of diabetic retinopathy. However, D'Amato said they would first test diabetic men only. If success is seen in the male diabetics, they will begin testing women. D'Amato said, "If we were going to use thalidomide in premenopausal women, we would have to be assured that they wouldn't get pregnant."

D'Amato said the reaction to the new therapy has been tremendous. "The idea of taking a pill to relieve this is novel," he said.

### Fighting for Air

Air pollution must be turned into the public nemesis that cigarette smoking has become. This underlying tenet from a conference sponsored by the National Association of Physicians for the Environment (NAPE) on November 18 will be developed into a major public education campaign targeting both the scientific community and the public.

In fact, much of the material for NAPE's anti-air pollution campaign will be drawn from the November conference detailing the impact of air pollution on body organs and systems. During that conference, scientific experts warned that lack of overt symptoms does not mean lack of adverse effects, and that the ravages of air pollution are not limited to the respiratory tract. "It's not just the