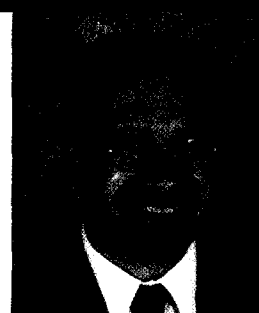


Chemical Reaction



Cosmetics & Compassion

The cosmetic industry rallies for good causes. **BY STEVE HERMAN**

**How far that little candle
throws his beams. So
shines a good deed in a
naughty world.**

—Shakespeare, *The Merchant of Venice*

COSMETIC TECHNOLOGY contributes more to society than the latest sunscreen or hair conditioner. The individuals, companies, and organizations of the personal-care industry are the source of countless good deeds. No personal effort symbolized the union of chemistry and compassion more than the purification of Lorenzo's Oil by Don Suddaby.

Lorenzo's Oil was the subject of the only Hollywood film from a major studio to discuss long chain fatty acids, a remarkable feat in itself. Lorenzo, the son of Augusto and Michaela Odone, has a rare disease, Adrenoleukodystrophy (ALD). ALD only afflicts males, being transmitted through the mother's X chromosome. In the disease, an overabundance of very

long chain fatty acids breaks down the myelin sheath that protects the nerve endings in the brain, leading to loss of sight and hearing, the ability to walk and talk, and eventually death. The root cause of the condition is a genetic mutation affecting the activity of the essential ligase enzyme.

Figure 1 shows the structure of a nerve. Axons carry the nerve impulse by creating an ion channel. Axons are very thin—a hundred could be placed inside a human hair. The myelin sheath is a coating of fatty cells covering the axon, acting as insulation. The nodes of Ranvier are the areas between the sections of myelin sheath. Nerve impulses travel faster along myelinated nerve fibers than unmyelinated ones. Impulses travel faster over thin axons than fat ones. The neurillema is a thin membrane that surrounds the axon in the peripheral nervous system and promotes regeneration. Not all cells have a neurillema, such as those in the brain and spinal cord, and these cells cannot regenerate.

Lorenzo Odone appeared normal at birth. He developed in his fourth year (1984) a serious condition that was

diagnosed as ALD. The boy was given two years to live by his doctor. Lorenzo's parents refused to accept a death penalty for their son, the failure of medical science to understand the disease, or the lack of a cure. ALD is an enzyme-related disease resulting in the demyelination of the nerves in the brain.

Lorenzo's parents concluded that a special mixture of fats could stabilize his condition. The elevation of very long chain saturated fatty acids (C24:0 lignoceric acid and C26:0 hexacosanoic) is normalized with the administration of Lorenzo's Oil (C18:1 oleic acid and C22:1 erucic acid). The key ingredient, erucic acid, has the structure: $\text{CH}_3(\text{CH}_2)_7\text{C}=\text{C}(\text{CH}_2)_{11}\text{COOH}$.

The search for a company willing to produce the oil ended at Croda Universal in Hull, England. Dr. Keith Coupland, Croda Universal's technical director, agreed to have Don Suddaby work on the extraction from rapeseed oil. Suddaby was a chemist with extensive experience in fatty acid chemistry. Within four months, working around the clock, Suddaby (who plays himself in the movie) prepared a liter of oil. The oil stabilized Lorenzo's

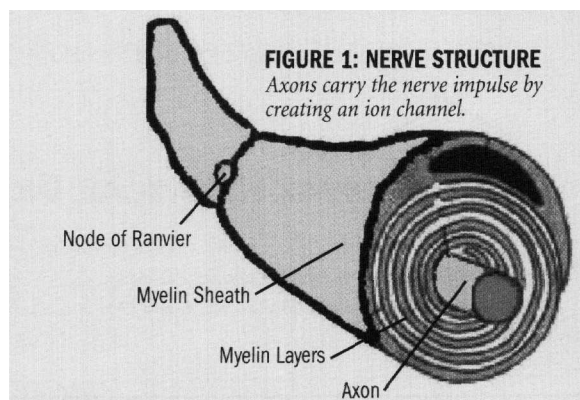


FIGURE 1: NERVE STRUCTURE

Axons carry the nerve impulse by creating an ion channel.

FIGURE 2: LORENZO'S OIL

Comparison of two different fatty acid compositions used in Lorenzo's Oil.

Constituent	Original Composition	Simplified Composition
C18:1	traces only	traces only
C18:2	traces only	traces only
C18:3	traces only	traces only
C20:0	traces only	0.2% maximum
C20:1	32.5%	1.0-3.5%
C20:2	—	traces only
C22:0	traces only	0.2% maximum
C22:1	65.0%	93.5-95%
C22:2	traces only	traces only
C24:0	zero	zero
C24:1	1% maximum	1.0-2.5%
C26:0	zero	zero

condition, and more oil was needed both for Lorenzo and for other boys suffering from ALD.

The synthesis process was deemed too difficult for production of the needed quantities, and Croda tried a simpler composition, which proved even better than the previous oil. The two fatty acid compositions are shown in Figure 2. The details of the extraction and purification of Lorenzo's Oil can be found in the patent issued to Suddaby and Coupland¹, which is remarkably readable for a legal document.

Lorenzo's Oil has not proven to be a miracle cure, but Lorenzo is still alive, defying the two-year life expectancy he was given in 1984. He can perform some simple acts, such as moving his arm. The Odone's established the Myelin Project², which actively promotes a cure for ALD. Lorenzo's Oil, while eliminating the biosynthesis of demyelinating fats, causes gross deficiency of omega 3 and omega 6 fatty acids. Recently, researchers have discovered that children with ALD are deficient in docosahexaenoic acid (DHA) and are conducting trials on the administration of this

fatty acid derived from algae. Despite criticism of Lorenzo's Oil as a cure for ALD, the Odone's persistence to save their son, the willingness of Croda to help their cause, and Don Suddaby's personal dedication to isolate the oil stand as symbols of hope for anyone facing seemingly impossible odds.

Companies and organizations in our industry promote many causes. Since most cosmetics are created for women, it is not surprising that female issues such as breast cancer are prominent concerns. Estée Lauder has its Pink Ribbon Breast Cancer Awareness Campaign, spreading information on the importance of early detection. Evelyn Lauder leads this mission, establishing The Breast Cancer Research Foundation in 1993 and serving on the Board of the Memorial Sloan-Kettering Cancer Center.

The Avon Breast Cancer Crusade promotes education and early detection. Money is raised through the sale of Crusade fund-raising products, and three-day, 60-mile fund-raising walks. A recent three-day walk took thousands of participants in the New York area from Bear Mountain to Manhattan.

Revlon has a Run/Walk to raise funds for breast and ovarian cancer, in addition to support for treatment of skin cancer, infertility, and AIDS. L'Oréal partners with the Ovarian Cancer Research Fund: Recently, it donated \$100,000 to directly fund a research grant focusing on development of new techniques for the early detection of ovarian cancer.

Industry organizations continue the work of individuals and companies. The CTFA has the "Look Good, Feel Better" program. The CEW supports Women in Need, along with other initiatives. The American Society of Perfumers has Toys for Tots, brightening the holidays for some needy children. The modern cosmetic industry, based in technology and driven by the marketplace, still has room in its heart for many causes vital to everyone. **GCI**

References

- 1 US5331009: Pharmaceutical compositions for treating Adrenoleukodystrophy.
- 2 <http://www.myelin.org/>

Steve Herman is director of R&D of AFF International. He has 28 years of experience in the industry, primarily in fragrance application. He serves as an adjunct professor in the FDU Masters in Cosmetic Science program, and has been active in numerous capacities with the SCC. He may be reached at (973) 244-5880, or by e-mail: GCISteve@aol.com.