

Electrochemistry in Medical Applications

by Mordechai Schlesinger

This issue of *Interface* is devoted to the subject matter of electrochemistry in the service of, and how it relates to, medicine. It is indeed timely for such a topic to be discussed by our Society. Medicine is the second oldest profession and as such deserves our closer attention. Further, in the ongoing process of “globalization,” we are witnessing not only the tendency of commercial unification of the globe but the rapidly emerging interdependency of different scientific and technical disciplines, as well. Indeed the much-banded-about “n” word—nanotechnology—may well evolve as the underlying thread in this technological melding process.

With the advent of relativity and quantum mechanics in the early part of the twentieth century, and the development of molecular biology in the second half, it is now accepted that mathematics, physics, chemistry, and biology constitute but different parts of the same broader scientific discipline. Such interdependency, and subsequent confluence, of different disciplines may as yet become one of the hallmarks of the twenty-first century.

Despite the above, it is often the case that the impact a given branch of science has upon another requires a rather special vehicle to become common knowledge. Given that, it is hardly surprising that the impact of electrochemistry in medicine is not yet properly recognized by all. This issue and its featured articles are designed to focus on electrochemistry as it relates to medical devices. Specifically, the oft-overlooked materials science aspects of medical devices, and related power sources that make them “tick,” are highlighted. This then is the focal point rather than the now extensively discussed topic of electrochemical sensors in medical devices. It is our hope that this special issue will give

the readership a broader view and an appreciation of the tremendous role electrochemistry plays in medicine and medical devices, as well as a glimpse into the future possibilities as both of these now related disciplines, develop in time. None of

these developments could have become a reality if not for the collaboration of device engineers, medical professionals, electrochemists, and battery scientists. Such collaborative efforts require the ability to communicate ideas to professionals outside of our own discipline as well as to understand and appreciate input from disciplines other than our own. It is reassuring to see the emergence in a number of universities of such interdisciplinary and crosscutting programs. This type of trend must be clearly encouraged for the process of “scientific globalization” to further flourish.

There are three feature articles in this special issue. The first, entitled *Electrochemistry and Medical Devices*, concludes that there is no doubt that electrochemistry and its constant progress can and will have substantial impact on the future of medical devices. The second, entitled *Electrochemical Power Sources and the Treatment of Human Illness*, concludes

that enabling all this (*i.e.*, medical advances) is the technology of electrochemical power sources. Thus, the article asserts that electrochemical power sources are truly an important part of modern health care. Finally the third feature, entitled *Electrochemical Imaging of Molecular Transport in Skin*, describes the use of scanning electrochemical microscopy (SECM) for imaging pathways of molecular transport across skin tissues. These three features together should amply illustrate the powerful role electrochemistry has played and will continue to play in medical advances, beyond the well-known realm of analytical applications. ■

