American Clinical Laboratory
September 1991

Editor's Page

Some puzzlements in life science research methodology

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Lewis Thomas observed, "Trying to be useful and failing at it is the major source of discontent, driving some of us crazy."

WHAT HAS BEEN driving me "crazy" for decades is a lurking fascination over a single question, "Are there discernible flaws in basic research techniques that interfere with laboratory studies designed to enhance our understanding of physiological processes?" That very question has now been scrutinized for two years as part of the RECNAC Project at the Bio-Communications Research Institute (Wichita, Kansas). Here are just three of several observations which would seem to have relevance to the question:

1. It is generally accepted that in order for cancer to develop there must be an impairment of cellular ON/OFF mechanisms involving differentiation. Yet one of the most basic ON/OFF mechanisms in nature appears largely ignored. The vast majority of scientific research is carried on in the light while human cells exist in red-adapted light or in more complete darkness. Perhaps it is important to consider, for instance, that breakdown of polyunsaturated fatty acids occurs 1000 times faster in response to light than to oxygen.
2. The universally accepted incubator temperature, except in special circumstances, is 37 °C. Human cells and cells of other animals are most commonly maintained in sophisticated units with automated thermostats set at the 37 °C level. This correlates well with human oral temperature. However, perhaps 37 °C is inappropriate to use in the study of cellular life as it exists in the internal organs of humans where the core temperature is 38 °C or more, or in other animals where the core temperature is 39 °C or more.
3. In order to maintain temperature, humidity, and carbon dioxide levels in cell incubators, controls, switches, LEDs, and heaters are in close proximity to the cell. This results in the cells' exposure to substantial and differing electromagnetic fields depending on placement within the incubator. Even though there are hundreds of scientific articles suggesting a relationship between cell-culture growth rates and electromagnetic fields, the fact that these fields are produced by the equipment itself is essentially ignored.

Is it possible that increasingly we are researching what is convenient in a convenient way? An old parable speaks to this issue. In the parable, a group of people is busily looking for something that is lost. They are in the bright sun carefully looking at the ground. As the search continues to no avail, they enlist help from many others who bring special expertise to look more precisely, dig more carefully, record more accurately. However, their efforts are without results. Finally someone asks, "Are you sure this is where it was lost?"

"Oh, no," is the reply, "It was lost over there in the dark, hard-to-reach place."

"Then why are you looking here?"

"Because it is so much easier to look here in the bright sun."

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