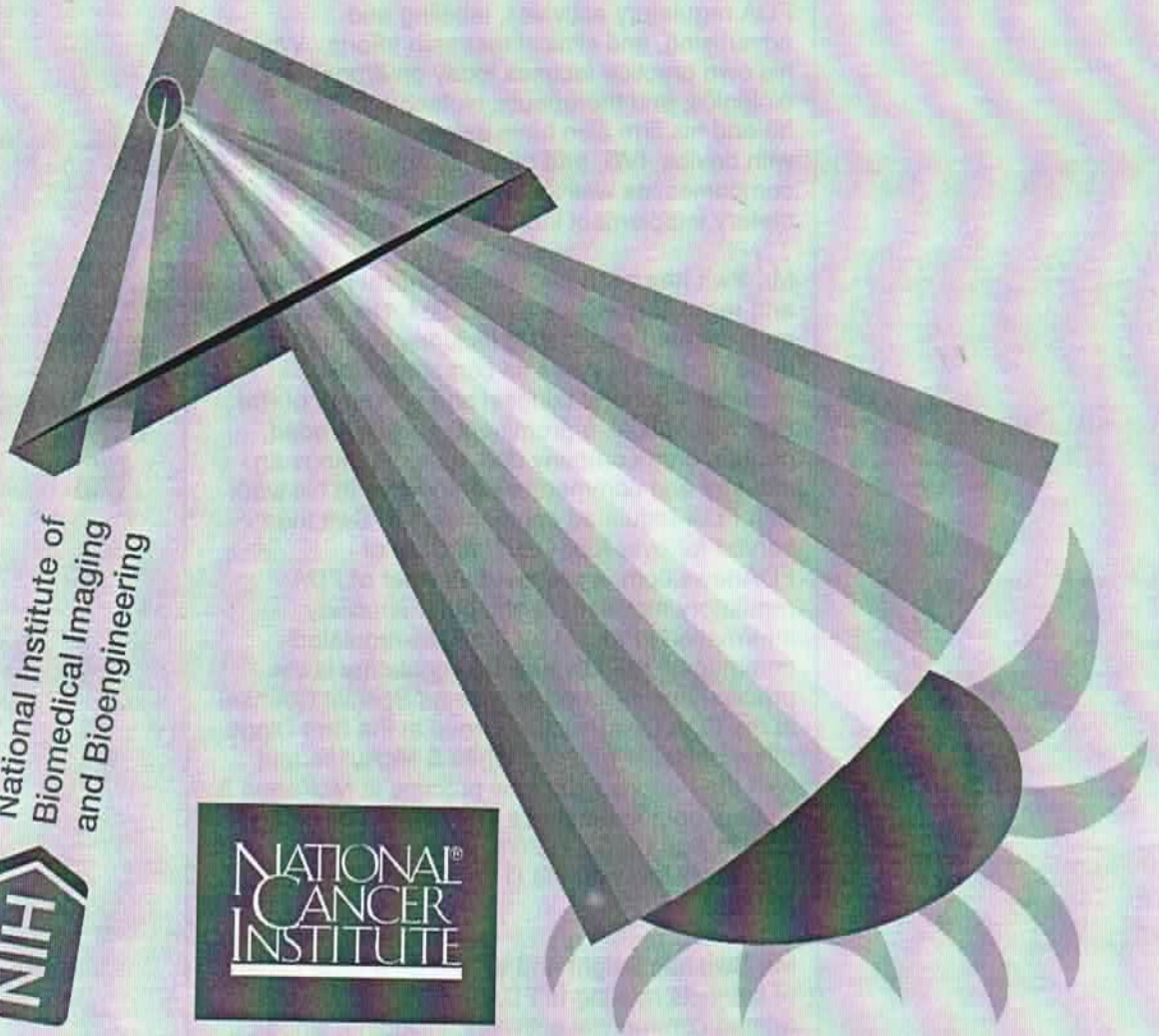


NCI-NIBIB Point of Care Technologies for Cancer Conference



National Institute of
Biomedical Imaging
and Bioengineering



Technologies to Overcome Cancer Challenges



National Institutes
of Health

Conference sponsored by the
National Institute of Biomedical
Imaging and Bioengineering
and the National Cancer Institute



January 8–10, 2014, Natcher Auditorium,
NIH campus – Building 45, Bethesda, Maryland

Changing Bioactivity of Live Cancer Cells In Vitro

(103)

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Modifying the “unstoppable growth of cancer cells” and changing it into more benign and probably controlled conduit, remains the unreachable goal of cancer scientists.

In 1982, we presented a prototype of an instrument comprising light microscope, cell culture chamber and a system for input and output of solutions inside the chamber, usable for in vitro measurement of enzyme catalysis inside single cells. Specimen was smeared onto transparent glass walls of the chamber and appropriate substrates, targeting specific metabolic (enzyme) reactions, were introduced inside the chamber under direct monitoring and recording through the microscope and camera. Alternating the reagent solution with known modifiers (inhibitors and activators) altered the chemical reactions allowing for investigation of unknown molecules. We used this prototype for development of different assays necessary for studying the location, distribution, size and catalytic power of bioactive molecules in different types of cells including malignant.

Not surprisingly, malignant cells had shown metabolic kinetics distinct from their normal counterparts. This data have been presented, but not formally synthesized and published thereafter.

In the Era when research priorities are given to low-cost medical devices, it seems appropriate to restore the ideas behind the development of this prototype towards new instruments for in vitro discovery of new drugs at the research points-of-care, the research laboratories at universities and pharmaceutical companies. Although not intended, this type of instruments could be used for in vitro testing safe and lethal doses of different toxins designed against human lives. This knowledge could well increase our level of preparedness against enemy attack inside the country.

A story of this prototype will be presented on a slide show during the meeting and will be discussed with those who are interested in development of simple, accurate and low cost drug sensitivity testing assays.

Cancerous Lesion Visualizing Device - Magnivisualiser

(104)

Ravi Mehrotra, Institute of Cytology and Prev. Oncology

In developing countries like India, the incidence of cervical cancer may be up to six times higher than in developed countries. Due to lack of cytoscreening programs, other alternative strategies such as visual inspection with acetic acid (VIA) were tried to detect early cancerous lesions of cervix in low resource setting. Problem with visual test is the extreme variation in sensitivity and low specificity. AV Magnivisualizer was designed to improve the sensitivity of VIA and reduce the non specific results as much as possible.

This instrument was also found suitable to examine the oral cavity for the presence of any pre-cancer and cancer lesions, where it improved the detection rate of lesions more than 1.5 times (50%) compared to tungsten light of torch in the field.

AV Magnivisualizer is low cost illumination and magnifying device for visualizing the cervix, which can be used, where there is no cytology and colposcopy facilities are not available. This device can also be used where even there is no electricity because it can be operated on 12 volt portable rechargeable battery. This unique device has following features:

White light of AV Magnivisualizer has color temperature of 5500K – 6000K with full visible spectrum of light (wave length 4000Å to 7800Å). Human eyes are most sensitive for 5550Å in yellow-green spectrum of visible light. Proper heat shield and special filter are provided to check the heat emitted by bulb. Interchangeable magnifying lenses (1+,2+,4+ diopter) are provided for different magnification.

Validation study of Magnivisualizer has already been completed under ICMR Task force project and the Salient features are:

1. The utility survey for both cervical and oral cavity examination clearly revealed that 95 to 100% of the examiners were comfortable with the instrument and were satisfied with different parameters of the examination.