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Uses of Immobilized Biological Compounds

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DEDICATION

**To Susan and Maresa
Our Loves and Our Lives**

PREFACE

On May 9-14, 1993, a NATO Advanced Research Workshop on the Analytical Uses of Immobilized Biological Compounds was held in Bressanone, Italy. The Director of the Workshop was Professor George G. Guilbault of the University of New Orleans, and the Co-Director was Professor Marco Mascini of the University of Florence.

It was the purpose of this meeting to assemble scientists from all NATO Countries with an interest in immobilized biological compounds, to discuss:

- methods of immobilization of proteins and their properties;
- antibody-antigen reactions;
- enzyme electrodes and biosensors;
- optical devices utilizing immobilized enzymes;
- microsensors and microbial sensors and clinical uses of immobilized enzymes;
- flow injection analysis using enzymes;
- immobilized biological compounds in chemical defense detection;
- pharmaceutical analysis;
- uses in industrial analysis;
- enzyme reactors;
- air pollution detectors;
- disposable immunosensors;
- medical uses and applications;
- mass production of sensors.

Goals to be achieved by the conference were:

- to permit an exchange of views and experience in all these areas;
- to review and critically assess the state-of-the-art in these fields;
- to set guidelines for future research and establish collaborative projects between scientists in NATO laboratories in the above areas.

Fifty-four lectures were given by 53 speakers in all of the above areas. Sessions were devoted to (1) general aspects of immobilizing biological compounds; (2) medical, clinical and pharmaceutical applications; (3) electrochemical biosensors; (4) electrochemical and optical biosensors; (5) defense applications; (6) immunosensors and receptors; (7) food, environmental, clinical and analytical applications; (8) biotechnology and marketing.

Finally, two hours were devoted to an open discussion of future status, new directions and joint projects.

This book is a publication of most of the lectures given at this workshop.

We wish to thank for their financial support of this conference: Università' di Padova, Universal Sensors (New Orleans) and especially NATO for the ARW grant that made the Conference possible. We also thank our organizing committee (Drs. Coulet, Weetall, Macca' and Palleschi) for the organization and local support.

CONCLUSIONS

In the last morning a round table discussion of selected speakers, the Directors and audience centered on the status of the field of Analytical Uses of Immobilized Biological Compounds, cooperation between labs and the future.

Several participants expressed appreciation to the Conference for the possibility to meet and develop contacts with scientists of other NATO Countries doing similar research. Collaborative projects were established between: (1) the Universities of Barcelona, Roma Tor Vergata, Coimbra, on Amperometric Based Biosensors Compatible with Mass Production Technologies for Pesticide Detection; (2) the Universities of Ioannina, Hacettepe, New Orleans and Coimbra on a CCMS Project on Management of Toxic Wastes. Their intention is to submit a project on Controlling Toxic Compounds with Biosensors; (3) the Universities of New Orleans and Quebec on New Biosensor Concepts; (4) the Universities of New Orleans and Bruxelles on Gas Phase Biosensors and PZ Antibodies; (5); the Universitites of New Mexico and Budapest on Stripping Analysis; (6) the Universitites of New Mexico and Milano on Food Biosensors; (7) the Universities of New Mexico and Bruxelles on Carbon Paste Biosensors; (8) the Universitites of New Orleans and Pavia on Toxin Biosensors; (9) the Universities of New Orleans, Florence and Roma Tor Vergata on PZ Immunosensors and Non-Invasive Sensors.

Discussion on new areas was devoted to (1) New Biological Materials, Receptors/Antibody Fragments, Toxin Probes; (2) Miniaturized Sensors, Electrochemical, Optical; (3) New Sampling Directions, Gas Phase, Non-Invasive; (4) Improved response/Market ability, Mediated Biosensors, New Directions, New Transducer, Optical, Arrays, Mass Production of Sensors, Screen Printing on Si, Al_2O_3 or Plastics; (5) Basic Studies, Importance of Position of Proteins and Antibodies, Studies with Microscopies like: AFM, TM, SEM, Thermodynamics Constants, Kinetics Equations, etc, CQN.

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