PLENARY

LIPID BIOCHEMISTRY AND MASS SPECTROMETRY: NEW ADVANCES AND NEW CHALLENGES

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Advances in mass spectrometric techniques over the past two decades have made an extraordinary impact on biological chemistry and the types of experiments that can be performed. While much of the focus of recent advances have been in the area of protein and peptide mass spectrometry, a parallel revolution in the use of mass spectrometry in lipid biochemistry has also taken place. It is now possible to analyze all lipids by mass spectrometry in spite of the fact that many of these molecules are nonvolatile and furthermore, collisional activation of lipid derived ions yields a wealth of structural information. One recognition of the capabilities of mass spectrometry has been the establishment of a consortium of investigators in the U.S., called Lipid Maps, which will be defining for the first time, those lipids present in a cell under normal and stimulated conditions. Out of this National Institutes of Health supported effort will come a large number of tools available to all investigators interested in applying mass spectrometry to lipid biochemistry. The application of mass spectrometry to one focused area of lipid biochemistry have involved experiments probing the stability of a chemically reactive lipid, leukotriene A_4, which is an essential intermediate in the biosynthetic process generating leukotriene B_4, a chemotactic factor for neutrophils and leukotriene C_4, a myotropic agent linked to symptoms of asthma in humans. The process by which leukotrienes are made in cells is extraordinarily complex and a detailed understanding of events taking place within the cell has required the power of mass spectrometry to unravel the mysteries of this pathway of arachidonic acid metabolism.