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Preface

Targeted lipidomics: endocannabinoids and other endolipid modulators

This special issue of *Life Sciences* stems from a 1-day workshop on Targeted Lipidomics held in Paestum, Italy, on June 22, 2004, as a satellite symposium to the XIV Annual Meeting of the International Cannabinoid Research Society. Speakers from this satellite symposium, as well as other renowned scientists in the field of bioactive lipids, contributed to this issue. The overall result is, in our judgement, a comprehensive overview of some of the frontiers in lipid research, with special focus on three major issues: (1) the relationship between the endocannabinoid system and other lipid mediators; (2) the role of lipid mediators, in particular the endocannabinoids, in the molecular mechanisms of drug reward, tolerance, dependence, and addiction; and (3) the emerging function of non-endocannabinoid lipid mediators in the regulation of cell function and animal physiology.

While the majority of the articles presented here deal with these three general themes, the role of cell membrane structural lipids and of “compartmentalization” in the correct functioning of lipid signals has also been highlighted in other contributions to this special issue, particularly in view of the fact that these small molecules are characterized by both “site-dependent” and “metabolism-dependent” functional plasticity. In fact, unlike other chemical signals, most bioactive lipids can undergo transformation into other mediators with different molecular targets in different subcellular sites. Furthermore, not only do their receptors appear to be located in distinct cell compartments, but their action at plasma membrane targets and their transport through the cell membrane itself also appear to be dependent on the presence of highly specialized “lipid rafts.” A number of talks were presented on these topics, and articles based on these talks are included in this proceedings volume. Finally, the use of a “lipidomics” approach (and, more specifically, of metabolite-profiling strategies to discover new lipids) and new functions for previously described lipid mediators is discussed. We believe that this special issue will provide a “real-time” description of the new trends in lipidology and will contribute to setting the bases for even further advances in the study of this fascinating and rapidly evolving class of bioactive molecules.

We are thrilled by the enthusiasm generated, the excellent participation by the audience, discussions on collaborative research projects, the feedback and recommendations to NIDA on these research advances, and potential future opportunities. The recommendations are very timely and may serve to further research in this emerging area. We like to thank the authors for their contributions.

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