

Contents

Preface	xi
1. Nitrosamine and <i>N</i>-Nitroso Compound Chemistry and Biochemistry: Advances and Perspectives	1
Richard N. Loeppky	
<i>N</i> -NITROSO COMPOUND EXPOSURE, FORMATION, AND BLOCKING	
2. Nitrosamines in Sunscreens and Cosmetic Products: Occurrence, Formation, and Trends	20
Donald C. Havery and Hardy J. Chou	
3. <i>N</i>-Nitrosodimethylamine in Nonfat Dry Milk	34
R. A. Scanlan, J. F. Barbour, F. W. Bodyfelt, and L. M. Libbey	
4. Prevention of Nitrosamine Exposure in the Rubber Industry	42
B. Spiegelhalder and C.-D. Wacker	
5. Blocking Nitrosamine Formation: Understanding the Chemistry of Rapid Nitrosation	52
Richard N. Loeppky, Yen T. Bao, Jaeyoung Bae, Li Yu, and Graziella Shevlin	
6. Quantitative Aspects of Nitrosamine Denitrosation	66
D. L. H. Williams	
7. Peptide Nitrosations	74
Brian C. Challis, Neil Carman, Maria H. R. Fernandes, Benjamin R. Glover, Farida Latif, Pravin Patel, Jaswinder S. Sandhu, and Shabaz Shuja	
8. Nitrosatable Secondary Amines: Exogenous and Endogenous Exposure and Nitrosation In Vivo	93
A. R. Tricker, B. Pfundstein, and R. Preussmann	

9. **Improved Methods for Analysis of *N*-Nitroso Compounds and Applications in Human Biomonitoring** 102
 B. Pignatelli, C. Malaveille, P. Thuillier, A. Hautefeuille, and H. Bartsch

NITRIC OXIDE CHEMISTRY AND BIOCHEMISTRY

10. **DNA Damage and Cytotoxicity Caused by Nitric Oxide** 120
 Steven R. Tannenbaum, Snait Tamir, Teresa de Rojas-Walker, and John S. Wishnok
- 11 **Chemistry of the “NONOates”: Unusual *N*-Nitroso Compounds Formed by Reacting Nitric Oxide with Nucleophiles**..... 136
 Larry K. Keefer, Danae Christodoulou, Tamba M. Dunams, Joseph A. Hrabie, Chris M. Maragos, Joseph E. Saavedra, and David A. Wink
12. **Nitric Oxide Production and Catalysis of *N*-Nitroso Compound Formation by Woodchucks (*Marmota monax*) and Woodchuck Hepatocytes in Culture** 147
 J. H. Hotchkiss, R. H. Liu, and T. J. Lillard

CHEMISTRY AND BIOCHEMISTRY OF NITROSAMINE ACTIVATION AND DETOXICATION

13. **Activation of *N*-Nitrosodialkylamines by Metalloporphyrin Models of Cytochrome P-450**..... 158
 M. Mochizuki, E. Okochi, K. Shimoda, and K. Ito
14. **Kinetics and Enzymes Involved in the Metabolism of Nitrosamines** 169
 Chung S. Yang, Theresa J. Smith, Jun-Yan Hong, and Shiqi Zhou
15. **Potential Mechanism of Action of Nitrosamines with Hydroxy, Oxo, or Carboxy Groups**..... 179
 G. Eisenbrand and C. Janzowski
16. **Activation of β -Hydroxyalkylnitrosamines: Evidence for Involvement of a Sulfotransferase** 195
 Christopher J. Michejda, Steven R. Koepke, Marilyn B. Kroeger Koepke, and Lidia Hernandez

17. **Hemoglobin Adducts, DNA Adducts, and Urinary Metabolites of Tobacco-Specific Nitrosamines as Biochemical Markers of Their Uptake and Metabolic Activation in Humans.....** 211
Stephen S. Hecht, Neil Trushin, and Steven G. Carmella
18. **Metabolism of *N'*-Nitrosornicotine by Rat Liver, Oral Tissue, and Esophageal Microsomes** 223
Sharon E. Murphy, Deborah A. Spina, and Rachel Heiblum
19. **Mechanisms of Inhibition of Tobacco-Specific Nitrosamine-Induced Lung Tumorigenesis in A/J Mice** 232
Fung-Lung Chung, Mark M. Morse, Karin I. Eklind, and Yong Xu

TOXIC, MUTAGENIC, AND CARCINOGENIC EFFECTS
OF *N*-NITROSO COMPOUNDS

20. **Chemical Structure of Nitrosamines Related to Carcinogenesis.....** 250
William Lijinsky
21. **Formation of Tobacco-Specific Nitrosamines: Carcinogenicity and Role of Dietary Fat in Their Carcinogenicity.....** 267
Dietrich Hoffmann, Abraham Rivenson, Ernst L. Wynder, and Stephen S. Hecht
22. **Possible Mechanisms of *N*-Nitrosodimethylamine Hepatotoxicity** 279
Michael C. Archer, Wei Chin, and Valentia M. Lee
23. **Genetic Tumor Epidemiology: Identifying Causative Carcinogenic Agents and Their Transforming Mutations.....** 290
B. I. Ludeke, H. Ohgaki, and P. Kleihues

REACTIVE INTERMEDIATES:
BRIEF DISCUSSIONS OF RESEARCH

24. **Electrophilic Addition to "AminoNONOate" ($R^1R^2NN(O)NO^-$) Ions.....** 304
Joseph E. Saavedra, Tamba M. Dunams, Judith L. Flippen-Anderson, and Larry K. Keefer

25. **Nitric Oxide–Nucleophile Complexes as Ligands: Structural Aspects of the Coordinated “NONOate” Functional Group in Novel Mixed-Ligand, Non-Nitrosyl Metal Complexes.....** 307
 Danae Christodoulou, David A. Wink, Clifford F. George, Joseph E. Saavedra, and Larry K. Keefer
26. **Radical Cations in Nitrosation of *tert*-Dialkyl Aromatic Amines.....** 309
 S. Singh, R. Hastings, and Richard N. Loeppky
- N*-NITROSO COMPOUND FORMATION AND INHIBITION:
 BRIEF DISCUSSIONS OF RESEARCH
27. **Nitrosamide Formation from Foodstuffs.....** 314
 P. Mende, R. Preussmann, and B. Spiegelhalter
28. **Tocopherol Inhibition of NO₂-Mediated Nitrosation: In Vitro and Biological Superiority of γ -Tocopherol.....** 317
 R. V. Cooney, A. A. Franke, L. J. Mordan, P. J. Harwood, V. Hatch-Pigott, and L. J. Custer
29. **pH Changes in Smokeless Tobaccos Undergoing Nitrosation** 320
 R. A. Andersen, P. D. Fleming, T. R. Hamilton-Kemp, and D. F. Hildebrand
- CHEMICAL AND BIOCHEMICAL MODELS AND DNA ADDUCT
 FORMATION: BRIEF DISCUSSIONS OF RESEARCH
30. **Oxidation of Alkylnitrosamines via the Fenton Reagent: Use of Nitrosamines To Probe Oxidative Intermediates in the Fenton Reaction** 324
 David A. Wink, Raymond W. Nims, Joseph E. Saavedra, Marc F. Desrosiers, and Peter C. Ford
31. **Structures of Mutagens Formed from Fenton-Type Oxidation of *N*-Nitrosodialkylamines** 328
 M. Mochizuki, N. Tsutsumi, S. Hizatate, and E. Okochi
32. **Metabolism of Methylbutyl- and Methylamylnitrosamine by Rat and Human Esophagus and Other Tissues and Induction of Esophageal Adenocarcinoma in Rats.....** 331
 S. S. Mirvish, Q. Huang, S. C. Chen, S. S. Park, and H. V. Gelboin

33. **Chemistry of Putative Intermediates in Bioactivation of β -Oxidized Nitrosamines**.....
Richard N. Loeppky, Eric Erb, Aloka Srinivasan, and Li Yu
34. **Modulation of *N*-Nitrosomethylbenzylamine Metabolism in Rats by Concurrently Administered Ethanol and Diallyl Sulfide**..... 337
B. I. Ludeke, Y. Yamada, F. Dominé, and P. Kleihues
35. **DNA Adducts Induced by Pancreas-Specific Nitrosamines**..... 340
Demetrius M. Kokkinakis and Jeffrey R. Norgle
36. **DNA Pyridyloxobutylation: 4-(Acetoxymethylnitrosamino)-1-(3-pyridyl)-1-butanone Inhibits the Repair of *O*⁶-Methylguanine**.....
Lisa A. Peterson, Xiao-Keng Liu, and Stephen S. Hecht
37. **Sequence-Specific Methylation of Single- and Double-Stranded DNA by Methylnitrosoarea**..... 346
R. W. Wurdeman and B. Gold

NITROSAMINE OCCURRENCE:
BRIEF DISCUSSIONS OF RESEARCH

38. **Detection of Tobacco-Related Hemoglobin Adducts by Quadrupole Mass Spectrometry**..... 352
E. Richter, B. Falter, C. Kutzer, and J. Schulze
39. **Nonvolatile *N*-Nitrosamides in Dried Squid: Analysis by High-Performance Liquid Chromatography–Photolysis–Chemiluminescence**..... 355
S. H. Kim and J. H. Hotchkiss
40. ***N*-Nitrosodiphenylamine in Diphenylamine-Treated Apples: Analysis by High-Performance Liquid Chromatography–UV Photolysis–Chemiluminescence**..... 358
T. J. Lillard and J. H. Hotchkiss
41. **Accumulation of Tobacco-Specific Nitrosamines during Curing and Aging of Tobacco**..... 361
H. R. Burton and L. P. Bush
42. **Human Exposure to a Tobacco-Specific Nitrosamino Acid**..... 363
A. R. Tricker, G. Scherer, F. Adlkofer, A. Pachinger, and H. Klus

43. Significance of Nitrosamines in Betel Quid Carcinogenesis	365
Bogdan Prokopczyk, Jacek Krzeminski, and Dietrich Hoffmann	
44. Characterization of <i>N</i>-Nitrosamino Acids in Tobacco Products and Assessment of Their Carcinogenic Potential	367
Mirjana V. Djordjevic, Jingrun Fan, Jacek Krzeminski, Klaus D. Brunnemann, and Dietrich Hoffmann	
45. Analysis of Tobacco-Specific Nitrosamines in Tobacco and Tobacco Smoke	369
Klaus D. Brunnemann and Dietrich Hoffmann	
Author Index	372
Affiliation Index	373
Subject Index.....	374