

Contents

Part 1

Transpeptidation and Isomerization

- The Role of Protein L-Isoaspartyl/D-Aspartyl O-Methyltransferase (PIMT) in Intracellular Signal Transduction 3
*T. Furuchi, K. Sakurako, M. Katane, M. Sekine, H. Homma**
- Modeling the Enolization of Succinimide Derivatives, a Key Step of Racemization of Aspartic Acid Residues: Importance of a Two-H₂O Mechanism 15
O. Takahashi, K. Kobayashi, A. Oda*
- Molecular-Dynamics Simulations for Amyloid β_{1-42} Monomer with D-Aspartic Acid Residues Using Continuous Solvent 23
A. Oda, K. Kobayashi, O. Takahashi*
- Accumulation of D- β -Aspartic Acid-Containing Proteins in Age-Related Ocular Diseases 31
Y. Kaji, T. Oshika, Y. Takazawa, M. Fukayama, N. Fujii*
- Quantification of Structural Alterations of L-Asp and L-Asn Residues in Peptides Related to Neuronal Diseases by Reversed-Phase High-Performance Liquid Chromatography 39
Y. Sadakane, K. Konoha, M. Kawahara, K. Nakagomi*
- SAXS and SANS Observations of Abnormal Aggregation of Human α -Crystallin 49
M. Sugiyama, N. Fujii, Y. Morimoto, K. Itoh, K. Mori, T. Fukunaga, N. Fujii*

Collapse of Homochirality of Amino Acids in Proteins from Various Tissues during Aging	59
<i>N. Fujii*, Y. Kaji, N. Fujii, T. Nakamura, R. Motoie, Y. Mori, T. Kinouchi</i>	
Influence of Oxidative Stress on D-Aspartyl Endopeptidase Activity	69
<i>T. Kinouchi*, A. Matsuda, S. Kawakami, T. Shimizu, T. Shirasawa, N. Fujii</i>	
Structural Consideration of Mammalian D-Aspartyl Endopeptidase	75
<i>T. Kinouchi*, N. Fujii</i>	
Oxidative Stress Induces the Formation of D-Aspartyl Residues in the Elastin Mimic Peptides	81
<i>K. Kuge, K. Kitamura, K. Nakaoji, K. Hamada, N. Fujii, T. Saito, N. Fujii*</i>	
Part 2 D-Amino Acid (D-Aspartic Acid) Oxidase	
Indispensable but Insufficient Role of Renal D-Amino Acid Oxidase in Chiral Inversion of N ^G -Nitro-D-arginine	89
<i>Y.-F. Xin, X. Li, B. Hao, N. Gong, W.-Q. Sun, R. Konno, Y.-X. Wang*</i>	
Comparative Characterization of Three D-Aspartate Oxidases and One D-Amino Acid Oxidase from <i>Caenorhabditis elegans</i>	101
<i>M. Katane, Y. Saitoh, Y. Seida, M. Sekine, T. Furuchi, H. Homma*</i>	
D-Aspartate Oxidase: The Sole Catabolic Enzyme Acting on Free D-Aspartate in Mammals	113
<i>M. Katane, H. Homma*</i>	
Mutant Mice and Rats Lacking D-Amino Acid Oxidase	129
<i>R. Konno*, K. Hamase, R. Maruyama, K. Zaitu</i>	

- Effects of D-Aspartate Treatment on D-Aspartate Oxidase, Superoxide Dismutase, and Caspase 3 Activities in Frog (*Rana esculenta*) Tissues 139

*L. Burrone, M. Di Giovanni, M. M. Di Fiore, G. C. Baccari, A. Santillo**

- Thyroid Hormones and D-Aspartic Acid, D-Aspartate Oxidase, D-Aspartate Racemase, H₂O₂, and ROS in Rats and Mice 147

*E. Topo, G. Fisher, A. Sorricelli, F. Errico, A. Usiello, A. D'Aniello**

- Aberrant Control of Motoneuronal Excitability in Amyotrophic Lateral Sclerosis: Excitatory Glutamate/D-Serine vs. Inhibitory Glycine/ γ -Aminobutanoic Acid (GABA) 159

J. Sasabe, S. Aiso*

Part 3

D-Amino Acids Related to Nutrition and Industrial Applications

- Origin, Microbiology, Nutrition, and Pharmacology of D-Amino Acids 173

M. Friedman

- Natural Occurrence and Industrial Applications of D-Amino Acids: An Overview 213

S. Martínez-Rodríguez, A. I. Martínez-Gómez, F. Rodríguez-Vico, J. M. Clemente-Jiménez, F. J. Las Heras-Vázquez**

- Enzymes Responsible for the Conversion of N^o-[(Benzyloxy)carbonyl]-D-lysine to N^o-[(Benzyloxy)carbonyl]-D-aminoadipic Acid by *Rhodococcus* sp. AIU Z-35-1 231

K. Isobe, N. Fukuda, S. Nagasawa, K. Saitou*

- New Biological Functions and Applications of High-Molecular-Mass Poly- γ -glutamic Acid 237

*H. Poo, C. Park, M.-S. Kwak, D.-Y. Choi, S.-P. Hong, I.-H. Lee, Y. T. Lim, Y. K. Choi, S.-R. Bae, H. Uyama, C.-J. Kim, M.-H. Sung**

	Identification and Biochemical Characterization of Membranous Short-Chain Polyglutamate from <i>Bacillus subtilis</i>	245
	<i>T. Kamei, D. Yamashiro, T. Horiuchii, Y. Minouchi, M. Ashiuchi*</i>	
Part 4	Amino Acid Racemases and Peptide Isomerases	
	Serine Racemase Knockout Mice	257
	<i>H. Mori*, R. Inoue</i>	
	Site-Directed Mutagenesis of Rice Serine Racemase: Evidence That Glu219 and Asp225 Mediate the Effects of Mg^{2+} on the Activity	263
	<i>Y. Gogami, A. Kobayashi, T. Ikeuchi, T. Oikawa*</i>	
	Detection and Function of the Intramolecular Disulfide Bond in Arginine Racemase: An Enzyme with Broad Substrate Specificity	275
	<i>D. Matsui, T. Oikawa*</i>	
	Mammalian Peptide Isomerase: Platypus-Type Activity Is Present in Mouse Heart	287
	<i>J. M. S. Koh, S. J. P. Chow, B. Crossett, P. W. Kuchel*</i>	
Part 5	Racemization Mechanisms and Chemistry of D-Amino Acids	
	Configurational Assignment of D- and L-Isovalines in Intact, Natural, and Synthetic Peptides by 2D-NMR Spectroscopy	299
	<i>M. De Zotti, E. Schievano, S. Mammi, B. Kaptein, Q. B. Broxterman, S. B. Singh, H. Brückner, C. Toniolo*</i>	
	Computational Insight into the Mechanism of Serine Residue Racemization	313
	<i>O. Takahashi*, K. Kobayashi, A. Oda</i>	
	Computational Modeling of the Enolization in a Direct Mechanism of Racemization of the Aspartic Acid Residue	319
	<i>O. Takahashi*, K. Kobayashi, A. Oda</i>	

Protein-Engineering Study of Contribution of Conceivable D-Serine Residues to the Thermostabilization of Ovalbumin under Alkaline Conditions	323
<i>N. Takahashi*, M. Maeda, M. Yamasaki, B. Mikami</i>	
Generation of Enantiomeric Amino Acids during Acid Hydrolysis of Peptides Detected by the Liquid Chromatography/Tandem Mass Spectroscopy	333
<i>T. Miyamoto, M. Sekine, T. Ogawa, M. Hidaka, H. Homma, H. Masaki*</i>	
Photolysis of <i>rac</i> -Leucine with Circularly Polarized Synchrotron Radiation	341
<i>U. J. Meierhenrich*, J.-J. Filippi, C. Meinert, S. V. Hoffmann, J. H. Bredehöft, L. Nahon</i>	
Amino Acid Ligand Chirality for Enantioselective Syntheses	351
<i>K. Micskei*, T. Patonay, L. Caglioti, G. Pályi*</i>	
Hydrophobicity of Peptides Containing D-Amino Acids	361
<i>T. Munegumi</i>	
Index	371