

# The Journal of PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS

VOLUME 274  
JULY 1995  
NUMBER 1

## Contents

### ANALGESICS

- Nitric Oxide/Cyclic Guanosine Monophosphate System in the Spinal Cord Differentially Modulates Intracerebroventricularly Administered Morphine- and  $\beta$ -Endorphin-Induced Antinociception in the Mouse** Jimmy Yu Xu and Leon F. Tseng 8
- Behavioral Effects and Receptor Binding Affinities of Fentanyl Derivatives in Rhesus Monkeys** Charles P. France, Lisa R. Gerak, Diana Flynn, Gail D. Winger, Fedor Medzihradsky, Jerome R. Bagley, Linda L. Brockunier and James H. Woods 17
- Excitatory Amino Acid Antagonists Attenuate the Effects of Cocaine on Extracellular Dopamine in the Nucleus Accumbens** Angela Pap and Charles W. Bradberry 127
- Interaction between Opioid Agonists and Neurotensin on Thermoregulation in the Rat. I. Body Temperature** Cynthia M. Handler, David J. Mondgock, Shu Fen Zhao, Ellen B. Geller and Martin W. Adler 284
- Studies of the Biogenic Amine Transporters. VI. Characterization of a Novel Cocaine Binding Site, Identified with [ $^{125}$ I]RTI-55, in Membranes Prepared from Whole Rat Brain Minus Caudate** Richard B. Rothman, Mayme L. Silverthorn, Michael H. Baumann, Carl B. Goodman, Jean L. Cadet, Dorota Matecka, Kenner C. Rice, F. Ivy Carroll, Jia-Bei Wang, George R. Uhl, John S. Partilla and Christina M. Dersch 385
- Behavioral and Biochemical Evidence of Opioidergic Involvement in Cocaine Sensitization** Mariaelvina Sala, Daniela Braida, Monica Colombo, Antonio Groppetti, Silvano Sacco, Enzo Gori and Marco Parenti 450

### AUTONOMIC PHARMACOLOGY

- Long-Term Sensory Denervation by Neonatal Capsaicin Treatment Augments Sympathetic Neurotransmission in Rat Mesenteric Arteries by Increasing Levels of Norepinephrine and Selectively Enhancing Postjunctional Actions** Vera Ralevic, Parastoo Karoon and Geoffrey Burnstock 64
- A-61603, a Potent  $\alpha$ 1-Adrenergic Receptor Agonist, Selective for the  $\alpha$ 1A Receptor Subtype** Sheila M. Knepper, Steven A. Buckner, Michael E. Brune, John F. DeBernardis, Michael D. Meyer and Arthur A. Hancock 97
- Ligand Binding Properties of Muscarinic Acetylcholine Receptor Subtypes (m1-m5) Expressed in Baculovirus-Infected Insect Cells** Guo Zheng Dong, Kimihiko Kameyama, Ago Rinke and Tatsuya Haga 378
- Classification of the Presynaptic Muscarinic Receptor Subtype That Regulates  $^3$ H-Acetylcholine Secretion in the Guinea Pig Urinary Bladder *In Vitro*** Pēteris Alberts 458

### BEHAVIORAL PHARMACOLOGY

- Does Adenosine Receptor Blockade Mediate Caffeine-Induced Rotational Behavior?** Bridgette E. Garrett and Stephen G. Holtzman 207
- Cocaethylene: Pharmacology, Physiology and Behavioral Effects in Humans** Elinore F. McCance, Lawrence H. Price, Thomas R. Kosten and Peter I. Jatlow 215
- Acute Administration of Buprenorphine in Humans: Partial Agonist and Blockade Effects** Sharon L. Walsh, Kenzie L. Preston, George E. Bigelow and Maxine L. Stitzer 361
- Different Effects of Cocaine and Nomifensine on Dopamine Uptake in the Caudate-Putamen and Nucleus Accumbens** Sara R. Jones, Paul A. Garris and R. Mark Wightman 396

## CARDIOVASCULAR PHARMACOLOGY

<b>Enhanced Responses to L-Arginine in Aortic Rings from Rats with Angiotensin-Dependent Hypertension</b>	Michael L. Pucci, Leslie B. Dick, Kathleen B. Miller, Carolyn J. Smith and Alberto Nasjletti	1
<b>The Effects of S-Nitrosocaptopril on Canine Coronary Circulation</b>	Ichiro Nakae, Masayuki Takahashi, Takeshi Kinoshita, Tetsuya Matsumoto and Masahiko Kinoshita	40
<b>Barium Inhibits the Endothelium-Dependent Component of Flow but not Acetylcholine-Induced Relaxation in Isolated Rabbit Cerebral Arteries</b>	George C. Wellman and John A. Bevan	47
<b>Effects of NKH 477, a Water Soluble Forskolin Derivative, on Cardiac Function in Rats with Chronic Heart Failure following Myocardial Infarction</b>	Atsushi Sanbe and Satoshi Takeo	120
<b>S-Nitrosoglutathione Improves Functional Recovery in the Isolated Rat Heart After Cardioplegic Ischemic Arrest—Evidence for a Cardioprotective Effect of Nitric Oxide</b>	E. A. Konorev, M. M. Tarpey, J. Joseph, J. E. Baker and B. Kalyanaraman	200
<b>Nitric Oxide Synthase Protects the Heart against Ischemia-Reperfusion Injury in Rabbits</b>	Shiro Hoshida, Nobushige Yamashita, Junsuke Igarashi, Masashi Nishida, Masatsugu Hori, Takenobu Kamada, Tsunehiko Kuzuya and Michihiko Tada	413
<b>Calcium Channel Antagonists: Cardiovascular Selectivity of Action</b>	Jianping Sun and David J. Triggle	419
<b>Effect of Combination Therapy with OK432 and Recombinant Human Interferon-<math>\alpha</math> A/D on Atrial Natriuretic Peptide Gene Expression in Mice with Viral Myocarditis</b>	Tsugiyasu Kanda, Tomoyuki Yokoyama, Susumu Imai, Tadashi Suzuki, Kazuhiko Murata and Isao Kobayashi	494
<b>Proarrhythmia of a Class Ic Drug: Suppression by Combination with a Drug Prolonging Repolarization in the Dog Late after Infarction</b>	Henry J. Duff, Margaret Stemler, Tom Thannhauser, Sylvie Laganiere, Elaine Rude and Wanda Lester	508
<b>On the Cardiac Contractile, Biochemical and Electrophysiological Effects of Cantharidin, a Phosphatase Inhibitor</b>	Joachim Neumann, Stefan Herzig, Peter Bokník, Martina Apel, Grit Kaspareit, Wilhelm Schmitz, Hasso Scholz, Martin Tepel and Norbert Zimmermann	530
<b>AF-DX 384 Binding in Rabbit Cingulate Cortex: Two Site Kinetics and Section Autoradiography</b>	Kevin L. Dopke, Kent E. Vrana, Leslie J. Vogt and Brent A. Vogt	562
<b>Mechanisms Underlying the Cardiovascular Responses to Peripheral Administration of NPFF in the Rat</b>	Michele Allard, Sylvie Labrousche, Anne Nosjean and Raul Laguzzi	577

## CELLULAR AND MOLECULAR PHARMACOLOGY

<b>Interaction of Ro 40-5967 and Verapamil with the Stably Expressed <math>\alpha_1</math>-Subunit of the Cardiac L-Type Calcium Channel</b>	Lubica Lacinová, Andrea Welling, Eva Bosse, Peter Ruth, Veit Flockerzi and Franz Hofmann	54
<b>Differential Coupling of m1, m2 and m3 Muscarinic Receptor Subtypes to Inositol 1,4,5-Trisphosphate and Adenosine 3',5'-Cyclic Monophosphate Accumulation in Chinese Hamster Ovary Cells</b>	Neil T. Burford, Andrew B. Tobin and Stefan R. Nahorski	134
<b>Functional Characterization of the Non-Peptide NK3 Receptor Antagonist, SR142801 on the Human NK3 Receptor Expressed in CHO Cells</b>	F. Oury-Donat, P. Carayon, O. Thurneyssen, V. Pailhon, X. Emonds-Alt, P. Soubrié and G. Le Fur	148
<b>Developmental Decrease in Ethanol Inhibition of N-methyl-D-aspartate Receptors in Rat Neocortical Neurons: Relation to the Actions of Ifenprodil</b>	David M. Lovinger	164
<b>High Susceptibility to Paraquat-Driven Lipid Peroxidation of Cultured Hepatocytes Loaded with Linolenic Acid</b>	Narumi Sugihara, Tatsuya Suetsugu and Koji Furuno	187
<b>LY 97241 Accelerates the Apparent Rate of Inactivation of Transient Outward <math>K^+</math> Current. Characterization of Open Channel Block</b>	Zhi Hao Zhang and Mitchell I. Steinberg	249
<b>Adenosine <math>A_1</math> and <math>A_{2b}</math> Receptors Coupled to Distinct Interactive Signaling Pathways in Intestinal Muscle Cells</b>	K. S. Murthy, L. McHenry, J. R. Grider and G. M. Makhlof	300

<b>Flecainide Inhibits the Transient Outward Current in Atrial Myocytes Isolated from the Rabbit Heart</b>	Takeshi Yamashita, Toshiaki Nakajima, Eiji Hamada, Hisanori Hazama, Masao Omata and Yoshihisa Kurachi	315
<b>Actions of the General Anesthetic Propofol on Recombinant Human GABA<sub>A</sub> Receptors: Influence of Receptor Subunits</b>	Enrico Sanna, Maria Paola Mascia, Ronald L. Klein, Paul J. Whiting, Giovanni Biggio and R. Adron Harris	353
<b>Voltage- and Time-Dependent Block by Perhexiline of K<sup>+</sup> Currents in Human Atrium and in Cells Expressing a Kv1.5-Type Cloned Channel</b>	David Rampe, Zhiguo Wang, Bernard Fermini, Barbara Wible, Richard C. Dage and Stanley Nattel	444
<b>A New Class III Antiarrhythmic Drug, MS-551, Blocks the Inward Rectifier Potassium Channel in Isolated Guinea Pig Ventricular Myocytes</b>	Ryoichi Sato, Shin-ichi Koumi, Ichiro Hisatome, Hiroyuki Takai, Yoshiaki Aida, Miki Oyaizu, Senya Karasaki, Hiroto Mashiba and Ryo Katori	469
<b>Endothelin Receptor in Human Astrocytoma U373MG Cells: Binding, Dissociation, Receptor Internalization</b>	Jinshyun R. Wu-Wong, William J. Chiou, Scott R. Magnuson and Terry J. Oppenorth	499
<b>Involvement of Heterotrimeric GTP-Binding Protein and rho Protein, but not Protein Kinase C, in Agonist-Induced Ca<sup>2+</sup> Sensitization of Skinned Muscle of Guinea Pig Vas Deferens</b>	Akikazu Fujita, Tadayoshi Takeuchi, Hidemitsu Nakajima, Hideaki Nishio and Fumiaki Hata	555
<b>CHEMOTHERAPY/GENE THERAPY</b>		
<b>Inhibition of Ornithine Decarboxylase Activity But Not Expression of the Gene by Cimetidine in Intestinal Mucosal Cells</b>	Jian-Ying Wang, Shirley A. McCormack, Mary Jane Viar and Leonard R. Johnson	521
<b>DRUG METABOLISM AND DISPOSITION</b>		
<b>Pharmacokinetics and Pharmacodynamics of Recombinant Human Interleukin-12 in Male Rhesus Monkeys</b>	Rosemary R. Nadeau, Carmen Ostrowski, Grace Ni-Wu and Daniel J. Liberato	78
<b>The Effect of N-Ethylmaleimide on the Na<sup>+</sup>-Dependent Nucleoside Transporter (N3) in Rabbit Choroid Plexus</b>	Carla B. Washington, Claire M. Brett, Xiaochun Wu and Kathleen M. Giacomini	110
<b>Effect of Increased Intra-Abdominal Pressure on Hepatic Extraction and Clearance of Fentanyl in Neonatal Lambs</b>	Eckhard Kuhls, Ian S. Gauntlett, Marie Lau, Ronald Brown, Colin D. Rudolph, David F. Teitel and Dennis M. Fisher	115
<b>The Influence of Dietary Restriction on the Metabolism of Theophylline and Antipyrine in the Ageing Female BN/BiRij Rat</b>	Kees Groen, Douwe D. Breimer, Adriaan Brouwer, Gerrit Schijff, Evelien J. Jansen and Cornelis F. A. van Bezooijen	143
<b>Time- and Dose-Dependent Pharmacokinetics of L-754,394, an HIV Protease Inhibitor, in Rats, Dogs and Monkeys</b>	Jiunn H. Lin, Masato Chiba, I-Wu Chen, Kari J. Vastag, Joy A. Nishime, Bruce D. Dorsey, Stuart R. Michelson and Stacey L. McDaniel	264
<b>Modulation of Thiotepa Antitumor Activity <i>In Vivo</i> by Alteration of Liver Cytochrome P450-Catalyzed Drug Metabolism</b>	Thomas K. H. Chang, Guan Chen and David J. Waxman	270
<b>Defining the Concentration-Effect Relationship of Volatile Anesthetics in Vessels Using an <i>in Vitro</i> Nonsteady-State Technique</b>	Niels F. Jensen and Talmage D. Egan	293
<b>Antipyrine Pharmacokinetics in the Tail-Suspended Rat Model</b>	Lane J. Brunner, Joseph T. DiPiro and Stuart Feldman	345
<b>Gastrointestinal Absorption of Peptide Drug: Quantitative Evaluation of the Degradation and the Permeation of Metkephamid in Rat Small Intestine</b>	Yoko Taki, Toshiyasu Sakane, Tanekazu Nadai, Hitoshi Sezaki, Gordon L. Amidon, Peter Langguth and Shinji Yamashita	373
<b>Ultrarapid Hydroxylation of Debrisoquine in a Swedish Population. Analysis of the Molecular Genetic Basis</b>	Marja-Liisa Dahl, Inger Johansson, Leif Bertilsson, Magnus Ingelman-Sundberg and Folke Sjöqvist	516

## ENDOCRINE PHARMACOLOGY

- Experimental Diabetic Neuropathy. Inhibition of Protein Mono-ADP-Ribosylation Prevents Reduction of Substance P Axonal Transport** Maria Lucia Donadoni, Roberto Gavezzotti, Fabio Borella, Anna Maria Di Giulio and Alfredo Gorio 570

## GASTROINTESTINAL PHARMACOLOGY

- Neural Control of Mouse Small Intestinal Longitudinal Muscle: Interactions with Inflammatory Mediators** J. M. Goldhill, F. D. Finkelman, S. C. Morris and T. Shea-Donohue 72
- Asparagine Stimulates Piglet Intestinal  $Cl^-$  Secretion by a Mechanism Requiring a Submucosal Glutamate Receptor and Nitric Oxide** J. Marc Rhoads, Robert A. Argenzio, Wunian Chen and Guillermo G. Gomez 404
- Antibodies to Intercellular Adhesion Molecule-1 Ameliorate The Inflammatory Response in Acetic Acid-Induced Inflammatory Bowel Disease** Patrick Y-K Wong, Gang Yue, Kingsley Yin, Masayuki Miyasaka, Caryl L. Lane, Anthony M. Manning, Donald C. Anderson and Frank F. Sun 475

## IMMUNOPHARMACOLOGY

- Dog Neutrophil Stimulation and Cell Surface Expression of Heat Shock Proteins Induced by AHN 086** A. Camins, E. Escubedo, J. Camarasa, J. Carretero, A. H. Newman and M. E. Kammüller 242
- Modulation of Superoxide Generation in *in Vivo* Lipopolysaccharide-Primed Rat Alveolar Macrophages by Arachidonic Acid and Inhibitors of Protein Kinase C, Phospholipase A<sub>2</sub>, Protein Serine-Threonine Phosphatase(s), Protein Tyrosine Kinase(s) and Phosphatase(s)** Alejandro M. S. Mayer, Susan Brenic, Rose Stocker and Keith B. Glaser 427
- Synergistic Effects of Tacrolimus and Human Interferon- $\alpha$  A/D in Murine Viral Myocarditis** Tsugiyasu Kanda, Hideki Nagaoka, Katsumi Kaneko, Janet E. Wilson, Bruce M. McManus, Susumu Imai, Tadashi Suzuki, Kazuhiko Murata and Isao Kobayashi 487

## NEUROPHARMACOLOGY

- Central-Type Benzodiazepine Receptors Mediate the Antidopaminergic Effect of Clonazepam and Melatonin in 6-Hydroxydopamine Lesioned Rats: Involvement of a Gabaergic Mechanism** C. C. Tenn and L. P. Niles 84
- Pharmacokinetic and Pharmacodynamic Analysis of the Actions of D-Amphetamine and D-Methamphetamine on the Dopamine Terminal** William P. Melega, Andrea E. Williams, Debra A. Schmitz, Emma W. DiStefano and Arthur K. Cho 90
- The Effect of Lorazepam Tolerance and Withdrawal on Metabotropic Glutamate Receptor Function** Martin Mortensen, Peter D. Suzdak and Christian Thomsen 155
- Determination of the Role of the 5-ht<sub>6</sub> Receptor in the Rat Brain: a Study Using Antisense Oligonucleotides** Anne Bourson, Edilio Borroni, Rachel H. Austin, Frederick J. Monsma Jr. and Andrew J. Sleight 173
- Pharmacological Characterization of Neuronal Acetylcholine Gated Ion Channel Receptor-Mediated Hippocampal Norepinephrine and Striatal Dopamine Release from Rat Brain Slices** Aida I. Sacaan, John L. Dunlop and G. Kenneth Lloyd 224
- Effects of Reserpine on Extracellular Caudate Dopamine and Hippocampus Norepinephrine Responses to Amphetamine and Cocaine: Mechanistic and Behavioral Considerations** Sandra M. Florin, Ronald Kuczenski and David S. Segal 231
- Characterization of a Recombinant Human Dopamine Transporter in Multiple Cell Lines** Amy J. Eshleman, Rachael L. Neve, Aaron Janowsky and Kim A. Neve 276
- Anticonvulsant and Antiepileptogenic Effect of L-Deprenyl (Selegiline) in the Kindling Model of Epilepsy** Wolfgang Löscher and Dagmar Hönack 307
- Substance P Stimulates and Inhibits Intestinal Peristalsis *via* Distinct Receptors** P. Holzer, W. Schluet and C. A. Maggi 322

<b>7-[4-[4-(2,3-Dichlorophenyl)-1-Piperazinyl]Butyloxy]-3,4-Dihydro-2(1H)-Quinolinone (OPC-14597), a New Putative Antipsychotic Drug with Both Presynaptic Dopamine Autoreceptor Agonistic Activity and Postsynaptic D<sub>2</sub> Receptor Antagonistic Activity</b>	Tetsuro Kikuchi, Katsura Tottori, Yasufumi Uwahodo, Tsuyoshi Hirose, Takashi Miwa, Yasuo Oshiro and Seiji Morita	329
<b>Pharmacological Characterization of the 5-Hydroxytryptamine-1A Receptor-Mediated Activation of High-Affinity GTP Hydrolysis in Rat Hippocampal Membranes</b>	Yuji Odagaki and Kjell Fuxe	337
<b>Developmental Deficiency of the Cholinergic System in Congenitally Hyperammonemic spf Mice: Effect of Acetyl-L-Carnitine</b>	L. Ratnakumari, Ijaz A. Qureshi, D. Maysinger and Roger F. Butterworth	437
<b>PROSTAGLANDINS, LEUKOTRIENES AND OTHER EICOSANOIDS</b>		
<b>An Inhibitor of Leukocyte Elastase Prevents Immune Complex-Mediated Hemorrhage in the Rat Lung</b>	Daniel S. Fletcher, Donald G. Osinga, Kevin Keenan, Robert J. Bonney, James B. Doherty, Paul E. Finke, Shrenik K. Shah and Philip Davies	548
<b>PULMONARY PHARMACOLOGY</b>		
<b>Naloxone-Induced and Spontaneous Reversal of Depressed Ventilatory Responses to Hypoxia during and after Continuous Infusion of Remifentanil or Alfentanil</b>	Hesham M. Amin, Andrew M. Sopchak, Barbara F. Esposito, Lynn G. Henson, Randal L. Batenhorst, Anthony W. Fox and Enrico M. Camporesi	34
<b>A Novel Polymeric Spermine Conjugate Inhibits Polyamine Transport in Pulmonary Artery Smooth Muscle Cells</b>	Shewan M. Aziz, Michael P. Gosland, Peter A. Crooks, Jack W. Olson and Mark N. Gillespie	181
<b>Isoproterenol Increases Cl Diffusion Potential Difference of Rabbit Trachea through Nitric Oxide Generation</b>	H. Takemura, J. Tamaoki, E. Tagaya, A. Chiyotani and K. Konno	584
<b>RENAL PHARMACOLOGY</b>		
<b>HWA-448 Reduces Gentamicin Toxicity in LLC-PK<sub>1</sub> Cells</b>	Douglas M. Ford, Rita E. Thieme, Cindy A. Lamp, Susan J. Covington and Bruce A. Molitoris	29
<b>Uptake of Drug-Carrier Liposomes by Placenta: Transplacental Delivery of Drugs and Nutrients</b>	S. Nilden Tüzel-Kox, Harish M. Patel and Wolfgang J. Kox	104
<b>Effects of Nephrotoxic <math>\beta</math>-Lactam Antibiotics on the Mitochondrial Metabolism of Monocarboxylic Substrates</b>	Bruce M. Tune and Chieh-Yin Hsu	194
<b>Renal Brush Border Membrane Vesicle Aminoglycoside Binding and Nephrotoxicity</b>	J. H. Todd and G. H. Hottendorf	258
<b>Role of Endothelin in Acute Renal Failure Due to Rhabdomyolysis in Rats</b>	Habib Karam, Patrick Bruneval, Jean-Paul Clozel, Bernd-Michael Löffler, Jean Bariéty and Martine Clozel	481
<b>TOXICOLOGY</b>		
<b>Dapsone-Induced Hemolytic Anemia: Effect of Dapsone Hydroxylamine on Sulfhydryl Status, Membrane Skeletal Proteins and Morphology of Human and Rat Erythrocytes</b>	David C. McMillan, JoAnne V. Simson, Robert A. Budinsky and David J. Jollow	540