

**Professor G.A.R. Johnston, AM, FTSE, FRACI, FRSN, FASCEPT, MSc, PhD, DPharm**

**Current Appointment:**

Emeritus Professor of Pharmacology and Medicinal Chemistry, The University of Sydney (since 2011)

**Previous Appointments:**

Director, Tick-Borne Diseases Limited and the Karl McManus Foundation for Lyme Disease Research and Awareness (2011-2017)  
ISN Historian, International Society of Neurochemistry (2014-2015)  
Member of the Technical Advisory Group (TAG) of the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2001-2011)  
Professor of Pharmacology and Medicinal Chemistry, The University of Sydney (1980-2011)  
Specialist Member, Administrative Appeals Tribunal, Commonwealth of Australia (1991-2014)  
Honorary Neuroscientist, Institute of Clinical Neurosciences, Royal Prince Alfred Hospital (1991-2011)  
Director (Research Programs), Herbal Medicines Research and Education Centre (HMREC), The University of Sydney (2004-2011)  
Research Fellow (1965), Fellow (1968) and Senior Fellow (1972-1980), Departments of Physiology and Pharmacology, John Curtin School of Medical Research, Australian National University, Canberra  
Chairman (1985-1987), Royal Australian Chemical Institute Division of Medicinal and Agricultural Chemistry  
President (1986), Australasian Society of Clinical and Experimental Pharmacologists  
President (1987-1989), Royal Australian Chemical Institute, NSW Branch  
Head (1983-1990), Department of Pharmacology, The University of Sydney  
Chairman (1990-1993), National Committee for Pharmacology, Australian Academy of Science  
National President (1992-1993), Royal Australian Chemical Institute  
Sub-Dean (Research) (1989-1993), Faculty of Medicine, The University of Sydney  
Foundation President (1991-1994), Asian Pacific Society for Neurochemistry (APSN)  
President (1993-1995), Federation of Australian Scientific and Technological Societies (FASTS)

**Address:**

*Work:*  
Sydney Pharmacy School, Pharmacology,  
The University of Sydney,  
NSW, 2006

E-mail graham.johnston@sydney.edu.au

*Home:*

11 Coronga Cres  
Killara, NSW, 2071 (Telephone 02-94-999-123)

**Personal Details:**

Australian, born in Sydney, 7 June 1939  
Married to Helen Jacqueline Johnston (nee Lloyd)  
No children

**Degrees:**

BSc (1st Class Honours & University Medal in Organic Chemistry), The  
University of Sydney, 1959  
MSc, The University of Sydney, 1961  
PhD, University of Cambridge, 1964  
DPharm, honoris causa, University of Copenhagen, 2007

**Awards and Honours:**

*University Medal for Organic Chemistry*, The University of Sydney, 1959  
*Royal Australian Chemical Institute, NSW Branch Student Prize*, 1959  
*Royal Commissioners for the Exhibition of 1851 Overseas Studentship*, 1961-1964  
*International Postdoctoral Research Fellowship*, US National Institutes of Health, 1964-1965  
*Royal Society and Nuffield Foundation Commonwealth Bursary*, 1970-1971  
Listed in "*The 1,000 Contemporary Scientists Most-Cited 1965-1978*" by the Institute for Scientific Information (ranked 4th amongst Australian Scientists in this list)  
1985 *Adrien Albert Lecturer* Royal Australian Chemical Institute, Division of Medicinal and Agricultural Chemistry.  
1988 *Liversidge Lecturer* at the Centenary ANZAAS Congress in Sydney  
1989 *Inaugural ASCEP Visiting Lecturer* to the British Pharmacological Society  
1989 *RACI Visiting Lecturer* to the New Zealand Institute of Chemistry  
1989 *H.G. Smith Memorial Medal*, awarded by the Royal Australian Chemical Institute for contributions to chemical science in Australia during the previous 10 years  
1991 *Bert Halpern Lecturer* Department of Chemistry, University of Wollongong  
1993 *Fellow of the Australian Academy of Technological Sciences and Engineering*  
1993 *Inaugural Michael Rand Medal*, awarded by The Australasian Society for Clinical and Experimental Pharmacologists and Toxicologists for

- outstanding contributions to the discipline of clinical and experimental pharmacology and toxicology
- 1996 *Leighton Memorial Medal*, the most prestigious award of the Royal Australian Chemical Institute in recognition of eminent services to chemistry in Australia
- 1997 *ANZAAS Medal*, Australian and New Zealand Association for the Advancement of Science for contributions to science particularly in the area of science policy
- 1998 *FASTS Australian Neuroscience Lecturer*, Australian Neuroscience Society
- 1998 *Member, Order of Australia*, for services to bio organic chemistry and pharmacology, to scientific organisations and to science policy development
- 2002 *Liversidge Lecturer*, Royal Society of New South Wales
- 2002 *Fellow, International Union of Pure and Applied Chemistry*
- 2003 *Centenary Medal*, Commonwealth of Australia, for service to Australian society in pharmacology
- 2007 *Doctor Pharmaciae honoris causa*, University of Copenhagen
- 2008 *ASCEPT Achievement Award* for outstanding service to Australasian pharmacology
- 2010 *ASCEPT Life Member*
- 2014 *RACI Life Member*
- 2015 *Fellow of the Royal Society of New South Wales*
- 2016 *Graham Johnston Best Thesis Award* Royal Australian Chemical Institute Division of Medicinal Chemistry and Medical Biology
- 2020 *Fellow of the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists*

### Research Experience:

- Research at *Sydney* (1959-1961; BSc and MSc) with Professor C.W. Shoppee, FRS, FAA, concerned with the study of reaction mechanisms employing steroids and triterpenes as model systems, and investigations of the pharmacologically active principles of the bark of the Pimply ash, *Balanops australiana* F. Muell.
- Research at *Cambridge* (1961-1964; Ph.D.) with Lord Todd, FRS, FAA on chemical aspects of protein biosynthesis.
- Research at *Berkeley* (1964-1965) with Dr M. Calvin, For.Mem.R.S., on biological control mechanisms.
- Research at *Canberra* (1965-1980) with Professor D.R. Curtis, FRS, FAA, on the neurochemistry and neuropharmacology of amino acid synaptic transmitters in the mammalian central nervous system.
- Study leave at *Cambridge* (1970-1971) with Dr L.L. Iversen, FRS, and Dr J.F. Mitchell on the uptake and release of amino acid synaptic transmitters.
- Study leave at *Copenhagen* (1975) with Dr P. Krogsgaard-Larsen on the development of new drugs that act on GABA synapses.

Research at *Sydney* (1980- ) on the neurochemistry and neuropharmacology of GABA, purines and related substances. Synthesis of new ligands to probe receptors for amino acid transmitters. Computer-assisted molecular modelling and drug design, particularly of new antiepileptic drugs. Mechanism of action of benzodiazepines and barbiturates. CNS actions of insecticides. Stress, steroids and amino acid neurotransmitters. Drugs in sport. Development of new neuroactive drugs.

### Scientific Societies:

*American Chemical Society* (1989-2010)

*Asian Pacific Society for Neurochemistry*, Foundation President (1991-4); Immediate Past President (1994-1996); Member of Program Committee for 1st APSN Meeting, Nagoya, Japan (1992); Member of Program Committee for 2nd APSN Meeting, Hyderabad, India (1994); Member of Council (1996-2004); Member of International Scientific Committee for 4th APSN Meeting, Seoul, Korea (1998)

*Australasian Society of Clinical and Experimental Pharmacologists* (1971), Member of ASCEP Council (1977-1983), Treasurer (1980-1982), Assistant Treasurer (1983), President Elect (1985), President (1986), Past President (1987), Member of Council (1991), Life Member (2010), Fellow (2020)

*Australian & New Zealand Association for the Advancement of Science* (1968) Member NSW Division Committee (1996-2014); Honorary Editor (1998-2002)

*Australian Neurosciences Society* (1979-2014)

*Australian Physiological and Pharmacological Society* (1968-2004)

*British Pharmacological Society* (1976-2010, retired member status 2011)

*International Society for Neurochemistry* (1973), Member of ISN Council (1977-1981), Chairperson of ISN Future Committee (1979-1983), Chairperson of Organising Committee for 13th Biennial Meeting of ISN, Sydney, Australia (1988-1991), Member of Organising Committee for 14th Biennial Meeting of ISN, Montpellier, France (1992-1993), Member of Advisory Board for the 15th Biennial Meeting of ISN, Kyoto, Japan (1993-1995), ISN Historian (2014-2015)

*International Brain Research Organisation* (1973)

*International Union of Pharmacology*, Council Delegate (1983-8) Delegate to IUPHAR General Assembly, London (1984) Co-Chairman, Scientific Programme Committee for 10th IUPHAR Congress held in Sydney (1987); Member of National Organising Committee for 10th IUPHAR Congress; Member of International Advisory Committee for 10th IUPHAR Congress; Leader of Australian Delegation to IUPHAR General Assembly, Sydney (1987)

*International Union of Pure and Applied Chemistry*, Fellow (2002)

*Pacificchem* RACI representative on Pacificchem Organising Committee for the 1995, 2000 and 2005 Congresses. Honorary Member of Pacificchem Organising Committee for 2010 and 2015 Congresses

*Royal Australian Chemical Institute* (1964), Fellow (1978), Foundation Deputy Chairman RACI Division of Medicinal and Agricultural Chemistry (1983-1985); Chairman of Division (1985-1987); Vice President, NSW Branch (1986/7), President, NSW Branch (1987/9), National Vice President (1991/2), National President (1992/3), National Immediate Past President (1993/4), Chair, Implementation Committee, Strategic Review of Chemistry (1993/6), Member, International Relations Committee (1993-2005), Life Member (2014), *Graham Johnston Best Thesis Award* Royal Australian Chemical Institute Division of Medicinal Chemistry and Medical Biology (2016)

*Royal Society of Chemistry* (UK) (1964-2007)

*Royal Society of New South Wales*, Fellow (2015)

*Society for Neuroscience* (1979-1999)

### **Scientific Journals:**

*Brain Research* - member of Editorial Board 1974-1994

*Neurochemical Research* - member of Editorial Board 1978-1987

*Developmental Neuroscience* - Foundation member of Editorial Advisory Board 1978-1981

*European Journal of Pharmacology* - member of Advisory Board 1980-1990; Consultant 1991-4

*Molecular Brain Research* - Foundation member of Editorial Advisory Board 1985-1994

*Neurochemistry International* - member of Editorial Board from 1984; Executive Editor for Australia and New Zealand 1989-1997

*Journal of Neuroscience Methods* - member of Editorial Board 1984-1998

*Epilepsy Research* - Foundation member of Editorial Board 1986-1998

*European Journal of Pharmacology, Molecular Pharmacology* - Foundation member of the Editorial Board 1988-1991

*Clinical and Experimental Pharmacology and Physiology* - member of Editorial Board 1988-2012

*Current CNS Patents* - Foundation member of Scientific Advisory Panel 1989-1990

*Molecular Neuropharmacology* - Foundation member of Editorial Board 1990-1994

*Drug Development Research* - member of Editorial Board 1992-1994

*Current Opinion in Central & Peripheral Nervous System Investigational Drugs* - Foundation member of Editorial Board 1999-2002

*Perspectives in Medicinal Chemistry* – member of Honorary Editorial Board 2007-2015

*Future Medicinal Chemistry* – Associate Editor, 2008-2015

*Current Bioactive Compounds* – member of Editorial Advisory Board, 2008-2014

*Medicinal Chemistry* – Regional Editor, 2010-2015

*Interactive Medicinal Chemistry* – Senior Editor, 2014

**Invited addresses at international and other major scientific meetings:**

- 6th International Congress of Pharmacology, Helsinki, Finland, 1975  
5th Meeting of the International Society for Neurochemistry, Barcelona, Spain, 1975  
GABA in Nervous System Function, Kroc Foundation, California, USA, 1975  
Iontophoresis and Transmitters Mechanisms in the Mammalian Central Nervous System, Cambridge, England, 1977  
NATO Advanced Study Institute on Amino Acid Transmitters, Spatind, Norway, 1977  
7th International Congress of Pharmacology, Paris, France, 1978  
Glutamic Acid: Advances in Biochemistry and Physiology, Milan, Italy, 1978  
GABA-Neurotransmitters, Copenhagen, Denmark, 1978  
GABA and Glutamate as Neurotransmitters, Sardinia, Italy, 1980  
7th Meeting of the International Society for Neurochemistry, Jerusalem, Israel, 1979  
Role of Peptides and Amino Acids as Neurotransmitters, Texas, USA, 1980  
Problems in GABA Research, Hakone, Japan, 1981  
Actions and Interactions of GABA and Benzodiazepines, London, England, 1983  
GABA Mechanisms and Their Clinical Significance, Cambridge, England, 1984  
9th International Congress of Pharmacology, London, England, 1984  
International Symposium on the Physiopharmacology of Synaptic Transmission, Rome, Italy, 1985  
Guest Speaker, Joint Symposium on Drugs and Behaviour, New Zealand Psychological Society and ASCEP New Zealand Section, Dunedin, New Zealand, 1986  
30th International Union of Physiological Sciences, Vancouver, Canada, 1986  
4th Congress of the Federation of Asian and Oceanian Biochemists, Singapore, 1986  
The Swedish Australian Scientific Symposium on "Integrative Mechanisms in Neural Function", Melbourne, 1987  
International Symposium on Amino Acid Transmitters, Canberra, 1987  
10th International Congress of Pharmacology, Sydney, 1987  
The Nature and Treatment of Anxiety, 7th International Australasian Winter Conference on Brain Research, Queenstown, New Zealand, 1989  
CIBA Foundation Symposium on Steroids and Neuronal Function, London, 1990  
Japanese Society for Neurochemistry, Plenary Lecturer, Hiroshima, 1990  
Amino Acids 91, Hunter Valley, 1991  
1st Meeting of the Asian Pacific Society for Neurochemistry, Nagoya, 1992  
Joint Meeting of the Western Pharmacology Society and the Australasian Society for Clinical and Experimental Pharmacologists, Plenary Lecturer, Lake Tahoe, Nevada 1993  
Neurotransmitters, receptors and neural connectivity - an international symposium to celebrate the scientific achievements of David Curtis, Canberra, 1993

14th Biennial Meeting of the International Society for Neurochemistry, Montpellier, France, 1993  
12th International Congress of Pharmacology, Plenary Lecturer, Montreal, 1994  
2nd Meeting of the Asian Pacific Society for Neurochemistry, Hyderabad, 1994  
15th Biennial Meeting of the International Society for Neurochemistry, Kyoto, 1995  
GABA Symposium '95, Kyoto, 1995  
Excitatory Amino Acid Signalling, Kyoto, 1995  
XXth Congress of the Collegium Internationale Neuro-psychopharmacologicum, Melbourne, 1996  
First Congress of the Federation of Asian-Oceanian Neurosciences Societies, Plenary Lecturer, Pattaya, Thailand, 1996  
18th Annual Meeting of the Australian Neuroscience Society, Canberra 27-30 January 1998, FASTS Australian Neuroscience Lecture  
4th Meeting of the Asian Pacific Society for Neurochemistry, Plenary Lecturer, Seoul, 24-26 June 1998  
3rd Australia-Japan Symposium on Drug Design and Development, Invited Lecturer, Tokushima, Japan, 29 September - 2 October 1998  
14th National Meeting of the RACI Division of Medicinal and Agricultural Chemistry, Plenary Lecturer, Wollongong, NSW, 24 November 1998  
13th Convocation of the Council of Academies of Engineering and Technological Sciences, Invited Lecturer, Sophia-Antipolis, France, 24-28 May 1999  
1st International Conference on Control and Diseases of Sodium Dependent Transport Proteins and Ion Channels, Plenary Lecturer, Shizuoka, Japan, 24-28 August 1999  
4th Australia-Japan Symposium on Drug Design and Development, Plenary Lecturer, Sheraton Towers, Southgate, Melbourne, 14-18 May 2000  
GABA2000, Invited Speaker, Cairns, 23-29 July 2000  
5th Australia-Japan Symposium on Drug Design and Development, Invited Speaker, Nara, Japan, 13-16 May 2002  
Liversidge Research Lecture, Royal Society of NSW, November 2002  
6 Decades of GABA, San Diego, invited speaker, 20-22 October 2004  
GABA2010, Venice, opening lecture, 22-28 August 2010  
The 10<sup>th</sup> Annual BIT Conference on International Drug Discovery Science and Technology, Nanjing, invited speaker and session chair, China 8-10 November 2012  
A celebration of life and work of Emeritus Professor David Curtis. AC, FAA, FRACP, FRS, Invited speaker, Australian Academy of Science, Canberra, 22 August 2018.

**Committees:**

Elected Member, Faculty Board, John Curtin School of Medical Research, Australian National University, 1973-1975

Member of the "Roy" Committee on the Administrative Structure of the John Curtin School of Medical Research, Australian National University, 1979

Member, The University of Sydney Library Committee, 1984-1989

Member, Australian Nuclear Science and Technology Organisation Medical Research Advisory Committee, 1986-8; Biomedicine and Health Advisory Committee, 1988-1994

Member, The University of Sydney Computer Policy Committee, 1987-1989

Australian Academy of Science National Committee for Pharmacology; Member, 1987-1989; Chair, 1990-1993; Member 1994-1996

Member, Joint Planning Committee for the Bicentennial Meeting of the Australian Societies for Experimental Biology, 1987-1988

Member, The University of Sydney Innovations Committee, 1988-1992

Member, NH&MRC Regional Grants Interviewing Committee, Brisbane, 1988-1990

Member, Visiting Committee for the School of Chemistry, University of New South Wales, 1988-2001

Chair, Faculty of Medicine Research Committee, The University of Sydney, 1989-1990

Chair, Faculty of Medicine Standing Committee on Research Policy, 1991-1993

Member, The University of Sydney Research Committee, 1989-1992

Chair, The University of Sydney ARC Small Grants Panel for Biological, Biomedical and Veterinary Science, 1990-1993

Member, Review Committee, Department of Pharmacology, Monash University, 1991

Member, Scientific Advisory Board, Biota Holdings Ltd, 1994-2004

Chair, NH&MRC Regional Grants Interviewing Committee, Adelaide/Perth, 1992

Member, International Organising Committee, 1995 International Chemical Congress of Pacific Basin Societies - Pacifichem 95

Member, Australian Jockey Club Scientific Review Committee, 1993-7

Chair, NH&MRC Regional Grants Interviewing Committee, Perth, 1993

Member, The Australian Science Olympiads National Advisory Board, 1993-1994

Chair, NH&MRC Regional Grants Interviewing Committee, Brisbane, 1994

Member, International Organising Committee, GABA Symposium '95, Kobe, Japan, 1995

Member, Reference Group, ASTEC Future Needs Study, 1994-5

Chair (1993-4) Member (1994-5), Operating Committee, Synrad Pharmaceuticals, a syndicated research & development partnership between AMRAD, CSIRO and the Macquarie Bank

Member, Scientific Advisory Board, Biota Holdings Limited, 1994-2004

Member, Review Committee, School of Chemistry, Macquarie University, 1995

Member, NSW Branch Committee, Academy of Technological Sciences and Engineering, 1994-6

Member of the Research Council (formerly the Scientific Advisory Committee), Co-Convener of the Neurobiology Panel and Member of the



Tissue Resource Panel of the Neuroscience Institute of Schizophrenia and Allied Disorders (NISAD), 1996-2006

Member of the Scientific Advisory Board of the Illawarra Foundation for Medical Research, 1996-1998

Member of the Organising Committee of the 57th National Science and Industry Forum of the Australian Academy of Science on 'Enhancing Australian chemical manufacture - reversing the chemical deficit', 1996

Member of a Ministerial Committee to review the Australian Sports Drug Testing Laboratory, 1996-7

Chair, Review Committee, Centre for Drug Design and Development, University of Queensland, 1997

Member of a committee concerned with Restructuring the Royal Australian Chemical Institute, 1997

Member, International Organising Committee, 2000 International Chemical Congress of Pacific Basin Societies - Pacifichem 2000

Member, Scientific Review Committee, NSW Thoroughbred Racing Board, 1997-2002

Member, Technical Advisory Group for Confidential Listing on the Australian Inventory of Chemical Substances, The National Industrial Chemicals Notification and Assessment Scheme (NICNAS), 1998-2012

Chair, Management Committee, PharmQuest Research Institute Ltd, 1998-2000

Member, Advisory Committee, Herbal Medicines Research and Education Centre, University of Sydney, 1999-2000

Member, NHMRC Pharmacology Discipline Panel, 1999

Member, International Union of Pure and Applied Chemistry (IUPAC) Task Group on Natural and Unnatural Substances Related to Human Health, 1999-2002

Reader for ARC Biological Sciences and Biotechnology discipline cluster (2001-2004)

Member, NHMRC Peripheral/Cellular Nervous System Grant Review Panel, 2002

Member, International Organising Committee, 2005 International Chemical Congress of Pacific Basin Societies - Pacifichem 2005

Chair, Organising Committee, 6th Australia-Japan Symposium on Drug Design and Development, Sydney, 27-30 June 2004

Topical Program Advisor for Biological Chemistry, Pacifichem December 2010

Member, Review Committee, School of Medicine and Pharmacology, University of Western Australia, November 2012

Member, Therapeutic Goods Administration Advisory Committee on Chemical Scheduling, 2020

**Research Funding:**

Total research funding The University of Sydney 1980-2011: \$15,939,180.

## CITATION DATA

**Emeritus Prof GAR Johnston, Pharmacology, Sydney Pharmacy School,  
Faculty of Medicine and Health, The University of Sydney**

More than 31,765 citations in Google Scholar to January 2024 3 publications are *Citation Classics*, and 78 have been cited more than 100 times (h-index: 90 publications have been cited at least 90 times). I am grateful to my many excellent students and co-workers that have enabled me to participate in such studies.

## REFERENCES

- (1) \*Amino acid transmitters in the mammalian central nervous system (D.R. Curtis and G.A.R. Johnston, *Rev. Physiol.*, 1974, **69**, 97-188) Times cited: 1737
- (2) \*Bicuculline, an antagonist of GABA and synaptic inhibition in the spinal cord (D.R. Curtis, A.W. Duggan, D. Felix and G.A.R. Johnston, *Brain Res.*, 1971, **32**, 69-96) Times cited: 837
- (3) \*The structural specificity of the high affinity uptake of L-glutamate and L-aspartate by rat brain slices (V.J. Balcar and G.A.R. Johnston, *J. Neurochem.*, 1972, **19**, 2657-2666) Times cited: 815
- (4) GABA, bicuculline and central inhibition (D.R. Curtis, A.W. Duggan, D. Felix and G.A.R. Johnston, *Nature*, 1970, **226**, 1222-1224) Times cited: 659
- (5) The hyperpolarization of spinal motoneurons by glycine and related amino acids (D.R. Curtis, L. Hösli and G.A.R. Johnston, *Exp. Brain Res.*, 1968, **5**, 235-258) Times cited: 611
- (6) A pharmacological study of the depression of spinal neurones by glycine and related amino acids (D.R. Curtis, L. Hösli and G.A.R. Johnston, *Exp. Brain Res.*, 1968, **6**, 1-18) Times cited: 591
- (7) The 'ABC' of GABA receptors: A brief review (M. Chebib and G.A.R. Johnston, *Clinical and experimental Pharmacology and Physiology*, 1999, **26**, 937-940) Times cited: 590
- (8) GABA-A receptor pharmacology (G.A.R. Johnston, *Pharmacology & Therapeutics*, 1996, **69**, 173-198) Times cited: 472
- (9) GABA uptake in rat central nervous system: comparison of uptake in slices and homogenates and the effects of some inhibitors (L.L. Iversen and G.A.R. Johnston, *J. Neurochem.*, 1971, **18**, 1939-1950) Times cited: 462
- (10) GABA-activated ligand gated ion channels: Medicinal chemistry and molecular biology (M. Chebib and G.A.R. Johnston, *Journal of Medicinal Chemistry*, 2000, **43**, 1427-1447) Times cited: 452

- (11) Antagonism between bicuculline and GABA in the cat brain (D.R. Curtis, A.W. Duggan, D. Felix, G.A.R. Johnston and H. McLennan, *Brain Res.*, 1971, **33**, 57-73) Times cited: 408
- (12) The specificity of strychnine as a central glycine antagonist (D.R. Curtis, A.W. Duggan and G.A.R. Johnston, *Exp. Brain Res.*, 1971, **12**, 547-565) Times cited: 407
- (13) A new class of GABA agonist (P. Krogsgaard-Larsen, G.A.R. Johnston, D. Lodge and D.R. Curtis, *Nature*, 1977, **268**, 53-55) Times cited: 387
- (14) Central nervous system depressant action of flavonoid glycosides (SP Fernandez, C Wasowski, LM Loscalzo, RE Granger, GAR Johnston, AC Paladini and M Marder, *European Journal of Pharmacology*, 2006, **539**, 168-176) Times cited: 382
- (15) Inhibition of GABA uptake in rat brain slices by nipecotic acid, various isoxazoles and related compounds (P. Krogsgaard-Larsen and G.A.R. Johnston, *J. Neurochem.*, 1975, **25**, 797-802) Times cited: 373
- (16) Spinal interneurone excitation by conformationally restricted analogues of L-glutamic acid (G.A.R. Johnston, D.R. Curtis, J. Davies and R.M. McCulloch, *Nature*, 1974, **248**, 804-805) Times cited: 366
- (17) GABA-A receptor channel pharmacology (GAR Johnston, *Current Pharmaceutical Design*, 2005, **11**, 1867-1885) Times cited: 358
- (18) Uptake and release of D- and L-aspartate by rat brain slices (L.P. Davies and G.A.R. Johnston, *J. Neurochem.*, 1976, **26**, 1007-1015) Times cited: 356
- (19) GABA-C receptors: 68lately simple transmitter-gated ion channels? (GAR Johnston, *Trends in Pharmacological Sciences*, 1996, **17**, 319-323) Times cited: 355
- (20) Structure and biological activity of a series of conformationally restricted analogues of GABA (P. Krogsgaard-Larsen, G.A.R. Johnston, D.R. Curtis, C.J.A. Game and R.M. McCulloch, *J. Neurochem.*, 1975, **25**, 803-809) Times cited: 317
- (21) Action of the neurotoxin kainic acid on high affinity uptake of L-glutamic acid in rat brain slices (G.A.R. Johnston, S.M.E. Kennedy and B. Twitchin, *J. Neurochem.*, 1979, **32**, 121-127) Times cited: 286
- (22) High affinity uptake of transmitters: studies on the uptake of L-aspartate, GABA, L-glutamate and glycine in cat spinal cord (V.J. Balcar and G.A.R. Johnston, *J. Neurochem.*, 1973, **20**, 529-539) Times cited: 287
- (23) Flavonoid modulation of GABA<sub>A</sub> receptors (JR Hanrahan, M. Chebib and GAR Johnston, *British Journal of Pharmacology*, 2011, **163**, 234–245) Times cited: 286
- (24) Glycine uptake in rat central nervous system slices and homogenates: evidence for different uptake systems in spinal cord and cerebral cortex (G.A.R. Johnston and L.L. Iversen, *J. Neurochem.*, 1971, **18**, 1951-1961) Times cited: 278
- (25) Excitation of mammalian central neurons by acidic amino-acids (D.R. Curtis, A.W. Duggan, J.C. Watkins, A.K. Tebecis, D. Felix and G.A.R. Johnston, *Brain Res.*, 1972, **41**, 283-301) Times cited: 272
- (26) GABA agonists and antagonists (P.R. Andrews and G.A.R. Johnston, *Biochem. Pharmac.*, 1979, **28**, 2697-2702) Times cited: 272

- (27) Central actions of ibotenic acid and muscimol (G.A.R. Johnston, D.R. Curtis, W.C. de Groat and A.W. Duggan, *Biochem. Pharmacol.*, 1968, **17**, 2488-2489) Times cited: 249
- (28) Neuropharmacology of amino acid inhibitory transmitters (G.A.R. Johnston, *Ann. Rev. Pharmacol. Toxicol.*, 1978, **18**, 269-289) Times cited: 247
- (29) 2-Hydroxy-saclofen: an improved antagonist at central and peripheral GABAB receptors (D.I.B. Kerr, J. Ong, G.A.R. Johnston, J. Abbenante and R.H. Prager, *Neuroscience Letters*, 1988, **92**, 92-96) Times cited: 245
- (30) Bicuculline-insensitive GABA receptors: studies on the binding of (-)-baclofen to rat cerebellar membranes (C.A. Drew, G.A.R. Johnston and R.P. Weatherby, *Neurosci. Letters*, 1984, **52**, 317-321) Times cited: 242
- (31) (+) and (-)-Borneol: efficacious positive modulators of GABA action at human recombinant  $\alpha 1\beta 2\gamma 2L$  GABAA receptors (RE Granger, EL Campbell and GAR Johnston, *Biochemical Pharmacology*, 2005, **69**, 1101-1111) Times cited: 238
- (32) Dihydromuscimol, thiomuscimol and related heterocyclic compounds as GABA analogues (P. Krosggaard-Larsen, H. Hjeds, D.R. Curtis, D. Lodge and G.A.R. Johnston, *J. Neurochem.*, 1979, **32**, 1717-1724) Times cited: 235
- (33) Central effects of beta-(p-chlorophenyl)-gamma-aminobutyric acid (D.R. Curtis, C.J.A. Game, G.A.R. Johnston and R.M McCulloch., *Brain Res.*, 1974, **70**, 493-499) Times cited: 227
- (34) Convulsive action of penicillin (D.R. Curtis, G.A.R. Johnston, C.J.A. Game, R.M. Maclachlan and R.M. McCulloch, *Brain Res.*, 1972, **43**, 242-248) Times cited: 225
- (35) Cis and trans-4-aminocrotonic acid as GABA analogues of restricted conformation (G.A.R. Johnston, D.R. Curtis, P.M. Beart, C.J.A. Game, R.M. McCulloch and B. Twitchin, *J. Neurochem.*, 1975, **24**, 157-160) Times cited: 225
- (36) Diazepam enhancement of low affinity GABA binding to rat brain membranes (J.H. Skerritt, M. Willow and G.A.R. Johnston, *Neurosci. Letters*, 1982, **29**, 63-66) Times cited: 208
- (37) Betel nut constituents as inhibitors of  $\gamma$ -aminobutyric acid uptake (G.A.R. Johnston, P. Krosggaard-Larsen and A. Stephanson, *Nature*, 1975, **258**, 627-628) Times cited: 205
- (38) Structure-activity studies on the inhibition of GABA binding to rat brain membranes by muscimol and related compounds (P. Krosggaard-Larsen and G.A.R. Johnston, *J. Neurochem.*, 1978, **30**, 1377-1382) Times cited: 202
- (39) Glutamate uptake by brain slices and its relation to depolarisation of neurones by acidic amino acids (V.J. Balcar and G.A.R. Johnston, *J. Neurobiol.*, 1972, **3**, 295-301) Times cited: 193
- (40) Advantages of an antagonist: bicuculline and other GABA antagonists (GAR Johnston, *British Journal of Pharmacology*, 2013, **169**, 328-336) Times cited: 191

- (41) Kava pyrones and resin: studies on GABA-A, GABA-B and benzodiazepine binding sites in rodent brain (L.P. Davies, C.A. Drew, P. Duffield, G.A.R. Johnston and D.D. Jamieson, *Pharmacology & Toxicology*, 1992, **71**, 120-126) Times cited: 187
- (42) The dietary flavonoids apigenin and (-)-epigallocatechin gallate enhance the positive modulation by diazepam of the activation by GABA of recombinant GABA<sub>A</sub> receptors (EL Campbell, M. Chebib and GAR Johnston, *Biochemical Pharmacology*, 2004, **68**, 1631-1638) Times cited: 182
- (43) Bicuculline methochloride as a GABA antagonist (G.A.R. Johnston, P.M. Beart, D.R. Curtis, C.J.A. Game, R.M. McCulloch and R.M. Maclachlan, *Nature New Biol.*, 1972, **240**, 219-220) Times cited: 178
- (44) The inhibition of spinal neurones by glycine (D.R. Curtis, L. Hösli and G.A.R. Johnston, *Nature*, 1967, **215**, 1502-1503) Times cited: 164
- (45) Inhibition of the uptake of GABA and related amino acids in rat brain slices by the optical isomers of nipecotic acid (G.A.R. Johnston, P. Krosgaard-Larsen, A.L. Stephanson and B. Twitchin, *J. Neurochem.*, 1976, **26**, 1029-1033) Times cited: 157
- (46) Baclofen: stereoselective inhibition of excitant amino acid release (G.A.R. Johnston, M.H. Hailstone and C.G. Freeman, *J. Pharm. Pharmac.*, 1980, **32**, 230-231) Times cited: 154
- (47) Enhancement of GABA binding by benzodiazepines and related anxiolytics (J.H. Skerrett and G.A.R. Johnston, *Eur. J. Pharmac.*, 1983, **89**, 193-198) Times cited: 147
- (48) Physiologic pharmacology of GABA and its antagonists in the vertebrate nervous system (G.A.R. Johnston, in *GABA in Nervous System Function* edited by E. Roberts, T.N. Chase and D.B. Tower, for Raven Press, New York, pages 394-411, 1976) Times cited: 147
- (49) Uptake and release of nipecotic acid by rat brain slices (G.A.R. Johnston, A.L. Stephanson, and B. Twitchin, *J. Neurochem.*, 1976, **26**, 83-87) Times cited: 145
- (50) The inactivation of extracellularly administered amino acids in the feline spinal cord (D.R. Curtis, A.W. Duggan and G.A.R. Johnston, *Exp. Brain Res.*, 1970, **10**, 447-462) Times cited: 142
- (51) Medicinal chemistry and molecular pharmacology of GABA-C receptors (Johnston GAR, *Current Topics in Medicinal Chemistry*, 2002, **2**, 897-907) Times cited: 141
- (52) Multiplicity of GABA receptors (G.A.R. Johnston, in *Benzodiazepine/GABA Receptors and Chloride Channels: Structural and Functional Properties*, ed. R.W. Olsen and J.C. Venter, Alan Liss, New York, 1986, pp. 57-71) Times cited: 137
- (53) Modulation of ionotropic GABA receptors by natural products of plant origin (GAR Johnston, JR Hanrahan, M Chebib, RK Duke and KN Mewett, *Advances in Pharmacology*, 2006, **54**, 285-316) Times cited: 136
- (54) Central actions of benzodiazepines (D.R. Curtis, D. Lodge, G.A.R. Johnston and S.J. Brand, *Brain Res.*, 1976, **118**, 344-347) Times cited: 133

- (55) Amino acid transmitters (D.R. Curtis and G.A.R. Johnston, *Handbook of Neurochemistry*, edited by A. Lajtha, vol. 4, Plenum Press, New York, 1970, 115-134. Also published in *Control Mechanisms in the Nervous System*, Springer, 1970, 115-134) Times cited: 129
- (56) The differential sensitivity of spinal interneurons and Renshaw cells to kainate and N-methyl-D-aspartate (R.M. McCulloch, G.A.R. Johnston, C.J.A. Game and D.R. Curtis, *Exp. Brain Res.*, 1974, **21**, 515-518) Times cited: 131
- (57) Molecular basis for differential inhibition of glutamate transporter subtypes by zinc ions (R.J. Vandenberg, A.D. Mitrovic and G.A.R. Johnston, *Molecular Pharmacology*, 1998, **54**, 189-196) Times cited: 126
- (58) Bicuculline and central GABA receptors (D.R. Curtis, A.W. Duggan, D. Felix and G.A.R. Johnston, *Nature*, 1970, **228**, 676-677) Times cited: 126
- (59) The flavonoid glycosides, myricitrin, gossypin and naringin exert anxiolytic action in mice (SP Fernandez, M Nguyen, TT Yow, C Chu, GAR Johnston, JR Hanrahan and M Chebib, *Neurochemical Research*, 2009, **34**, 1867-1875) Times cited: 122
- (60) Effects of the Areca nut constituents arecaidine and guvacine on the action of GABA in the central nervous system (D. Lodge, G.A.R. Johnston, D.R. Curtis and S.J. Brand, *Brain Res.*, 1977, **136**, 513-522) Times cited: 119
- (61) Enhancement of GABA binding by pentobarbitone (M. Willow and G.A.R. Johnston, *Neuroscience Lett.*, 1980, **18**, 323-327) Times cited: 119
- (62) Muscimol uptake, release and binding in rat brain slices (G.A.R. Johnston, S.M.E. Kennedy and D. Lodge, *J. Neurochem.*, 1978, **31**, 1519-1523) Times cited: 119
- (63) Effects of a naturally occurring neurosteroid on GABA-A IPSCs during development in rat hippocampal or cerebellar slices (EJ Cooper, GAR Johnston and FA Edwards, *Journal of Physiology*, 1999, **521.2**, 437-449) Times cited: 119
- (64) Convulsions induced in 10-day-old rats by intraperitoneal injection of monosodium glutamate and related amino acids (G.A.R. Johnston, *Biochem. Pharmacol.*, 1973, **22**, 137-140) Times cited: 119
- (65) Competitive inhibition of GABA uptake in rat brain slices by some GABA analogues of restricted conformation (P.M. Beart, G.A.R. Johnston and M.L. Uhr, *J. Neurochem.*, 1972, **19**, 1855-1861) Times cited: 118
- (66) Glutamate and related amino acids in cat spinal roots, dorsal root ganglia and peripheral nerves (A.W. Duggan and G.A.R. Johnston, *J. Neurochem.*, 1970, **17**, 1205-1208) Times cited: 118
- (67) Synthesis and activity of a potent N-methyl-D-aspartic acid agonist, *trans*-1-aminocyclobutane-1,3-dicarboxylic acid, and related phosphonic and carboxylic acids (R.D. Allan, J.R. Hanrahan, T.W. Hambley, G.A.R. Johnston, K.N. Mewett and A.D. Mitrovic, *J. Med. Chem.*, 1990, **33**, 2905-2915) Times cited: 118

- (68) Contrasting modes of action of methylglutamate derivatives on the excitatory amino acid transporters, EAAT1 and EAAT2 (RJ Vandenberg, AD Mitrovic, M Chebib, VJ Balcar and GAR Johnston, *Mol. Pharmacol.*, 1997, **51**, 809-815) Times cited: 116
- (69) Glycine, strychnine, picrotoxin and spinal inhibition (D.R. Curtis, A.W. Duggan and G.A.R. Johnston, *Brain Res.*, 1969, **14**, 759-62) Times cited: 112
- (70) Muscimol as an ionotropic GABA receptor agonist (G.A.R. Johnston, *Neurochemical Research*, 2014, **39**, 1942-1947) Times cited: 113
- (71) Pharmacology of barbiturates: electrophysiological and neurochemical studies (M. Willow and G.A.R. Johnston, *Int. Rev. Neurobiol.*, 1983, **24**, 15-49) Times cited: 109
- (72) The intraspinal distribution of some depressant amino acids (GAR Johnston, *J. Neurochem.*, 1968, **15**, 1013-1017) Times cited: 109
- (73) Prediction of receptor properties and binding affinity of ligands to benzodiazepine/GABA-A receptors using artificial neural networks (D.J. Maddalena and G.A.R. Johnston, *Journal of Medicinal Chemistry*, 1995, **38**, 715-724) Times cited: 106
- (74) Chemical instability of the GABA antagonist bicuculline under physiological conditions (R.W. Olsen, M. Bann, T. Miller and G.A.R. Johnston, *Brain Res.*, 1975, **98**, 383-387) Times cited: 104
- (75) Natural and synthetic substances related to human health (IUPAC Technical Report) (Topliss JG, Clark AM, Ernst E, Hufford C, Johnston GAR, Rimoldi JM and Weimann BJ, *Pure and Applied Chemistry*, 2002, **74**, 1957-1985) Times cited: 103
- (76) GABA uptake in rat brain slices: inhibition by GABA analogues and by various drugs (P.M. Beart and G.A.R. Johnston, *J. Neurochem.*, 1973, **20**, 319-324) Times cited: 103
- (77) Glutamate: transmitter in the central nervous system (PJ Roberts, J Storm-Mathisen and G.A.R Johnston. *John Wiley & Sons*, 1981) Times cited: 100
- (78) GABA-C receptors as drug targets (GAR Johnston, M Chebib, JR Hanrahan and KN Mewett, *Current Drug Targets – CNS & Neurological Disorders*, 2003, **2**, 260-268) Times cited: 100
- (79) Novel, potent and selective GABA<sub>C</sub> antagonists inhibit myopia development and facilitate learning and memory (M Chebib, T Hinton, KL Schmid, D Brinkworth, H Qian, S Matos, H-L Kim, H Abdel-Halim, RJ Kumar, GAR Johnston and JR Hanrahan, *Journal of Pharmacology and Experimental Therapeutics*, 2009, **328**, 448–457) Times cited: 97
- (80) Interactions of the anticonvulsant carbamazepine with adenosine receptors. 1. Neurochemical studies (J.H. Skerrett, L.P. Davies and G.A.R. Johnston, *Epilepsia*, 1983, **25**, 634-642) Times cited: 97
- (81) Increased GABA binding in mouse brain following acute swim stress (J.H. Skerrett, P. Trisdikoon and G.A.R. Johnston, *Brain Res.*, 1981, **215**, 398-403) Times cited: 97
- (82) Bilobalide, a sesquiterpene trilactone from *Ginkgo biloba*, is an antagonist at recombinant  $\alpha 1\beta 2\gamma 2L$  GABA-A receptors (Huang SH,

- Duke RK, Chebib M, Sasaki K, Wada K and Johnston GAR, *European Journal of Pharmacology*, 2003, **464**, 1-8) Times cited: 97
- (83) The anxiogenic-like and anxiolytic-like effects of MDMA on mice in the elevated plus maze: a comparison with amphetamine (H.G. Lin, P.M. Burden, M.J. Christie and G.A.R. Johnston, *Pharmacology Biochemistry and Behavior*, 1999, **62**, 403-408) Times cited: 96
- (84) Plasma GABA, GABA-like activity and the brain GABA-benzodiazepine receptor complex in rats with chronic hepatic encephalopathy (J.E. Maddison, P.R. Dodd, M. Morrison, G.A.R. Johnston and G.C. Farrell, *Hepatology*, 1987, **7**, 621-628) Times cited: 96
- (85) Synthetic analogs for the study of GABA as a neurotransmitter (R.D. Allan and G.A.R. Johnston, *Med. Res. Rev.*, 1983, **3**, 91-118) Times cited: 94
- (86) A purinergic component in the anticonvulsant action of carbamazepine? (J.H. Skerrett, L.P. Davies and G.A.R. Johnston, *Eur. J. Pharmacol.*, 1982, **82**, 195-197) Times cited: 94
- (87) Stress and GABA-A receptors (K.J. Skilbeck, G.A.R. Johnston and T. Hinton, *Journal of Neurochemistry*, 2010, **112**, 1115-1130) Times cited: 94
- (88) Antidepressant, anxiolytic and antinociceptive activities of constituents from *Rosmarinus Officinalis*, (A Abdelhalim, N Karim, M Chebib, T Aburjai, I Khan, GAR Johnston and JR Hanrahan, *Journal of Pharmacy & Pharmaceutical Sciences*, 2015, **18**, 448-459) Times cited: 94
- (89) Semisynthetic preparation of amentoflavone: a negative modulator at GABA-A receptors (J.R. Hanrahan, M. Chebib, N.M. Davucheron, B.J. Hall and G.A.R. Johnston, *Bioorganic & Medicinal Chemistry Letters*, 2003, **13**, 2281-2284) Times cited: 93
- (90)  $\gamma$ -Aminobutyric acid agonists: an *in vitro* comparison between depression of spinal synaptic activity and depolarization of spinal root fibres in the rat (R.D. Allan, R.H. Evans and G.A.R. Johnston, *Brit. J. Pharmac.*, 1980, **70**, 609-615) Times: cited: 92

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