

**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*
- 2024 Named in the top 0.05% of all scholars worldwide by ScholarGPS, California as an inaugural Highly Ranked Scholar. Ranked 55 in pharmacology and toxicology.

### 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 33,000 citations in Google Scholar to January 2026. 3 publications are *Citation Classics*, and 86 have been cited more than 100 times (h-index: 92 publications have been cited at least 92 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: 1788
- (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: 846
- (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: 838
- (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: 676
- (5) 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: 653
- (6) The hyperpolarization of spinal motoneurons by glycine and related amino acids (D.R. Curtis, L. Höslí and G.A.R. Johnston, *Exp. Brain Res.*, 1968, **5**, 235-258) Times cited: 609
- (7) A pharmacological study of the depression of spinal neurones by glycine and related amino acids (D.R. Curtis, L. Höslí and G.A.R. Johnston, *Exp. Brain Res.*, 1968, **6**, 1-18) Times cited: 603
- (8) GABA-A receptor pharmacology (G.A.R. Johnston, *Pharmacology & Therapeutics*, 1996, **69**, 173-198) Times cited: 503
- (9) GABA-activated ligand gated ion channels: medicinal chemistry and molecular biology (Chebib M and Johnston GAR, *Journal of Medicinal Chemistry*, 2000, **43**, 1427-1447) Times cited: 469
- (10) 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: 467
- (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: 417
- (12) 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: 417
- (13) 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: 413
- (14) 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: 396
- (15) GABA<sub>A</sub> receptor channel pharmacology (GAR Johnston, *Current Pharmaceutical Design*, 2005, **11**, 1867-1885) Times cited: 394

- (16) 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: 383
- (17) GABA-C receptors: 68latively simple transmitter-gated ion channels? (GAR Johnston, *Trends in Pharmacological Sciences*, 1996, **17**, 319-323) Times cited: 369
- (18) 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: 367
- (19) 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: 349
- (20) 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: 330
- (21) 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: 313
- (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: 293
- (23) 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: 285
- (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: 284
- (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: 282
- (26) GABA agonists and antagonists (P.R. Andrews and G.A.R. Johnston, *Biochem. Pharmac.*, 1979, **28**, 2697-2702) Times cited: 277
- (27) (+) and (-)-Borneol: efficacious positive modulators of GABA action at human recombinant  $\alpha 1\beta 2\gamma 2L$  GABA<sub>A</sub> receptors (RE Granger, EL Campbell and GAR Johnston, *Biochemical Pharmacology*, 2005, **69**, 1101-1111) Times cited: 262
- (28) 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: 259
- (29) 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: 258
- (30) Neuropharmacology of amino acid inhibitory transmitters (G.A.R. Johnston, *Ann. Rev. Pharmacol. Toxicol.*, 1978, **18**, 269-289) Times cited: 253
- (31) 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: 248
- (32) Advantages of an antagonist: bicuculline and other GABA antagonists (GAR Johnston, *British Journal of Pharmacology*, 2013, **169**, 328-336) Times cited: 245
- (33) 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: 240
- (34) 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: 231
- (35) 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: 229
- (36) 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: 226
- (37) 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: 218
- (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: 210
- (39) The dietary flavonoids apigenin and (-)-epigallocatechin gallate enhance the positive modulation by diazepam of the activation by GABA of recombinant GABAA receptors (EL Campbell, M. Chebib and GAR Johnston, *Biochemical Pharmacology*, 2004, **68**, 1631-1638) Times cited: 204
- (40) 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: 203
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