Webinar #11: IUPHAR Web Resources
Simplifying Complexity for Medicine and Education
Speakers

Michael Spedding, IUPHAR Secretary General
Adam Pawson, Senior Database Curator
Steve Alexander, NC-IUPHAR Chair
Joanna Sharman, Senior Database Developer
Simon Harding, Database Developer Immunopharmacology
Jamie Davies, Database Chair/Principal Investigator
John Szarek, IUPHAR Pharmacology Education Project Co-Lead
Lynn LeCount, IUPHAR Administrative Officer
IUPHAR: Overview and strategy
Michael Spedding
Healthcare: two worlds

WHO:
>4800 million people live in developing countries
>2700 million people live on <2$/day.
Needs: drugs, vaccines and education
International Union of Basic and Clinical Pharmacology

Pharmacology – one world, targeted by expert web sites

Established in 1965
68 member societies

Countries not represented by at least one IUPHAR member society
Some relevant WHO Priorities where IUPHAR is active

- Promote Drug Discovery R&D, with open-source knowledge, databases, compound libraries,
- Support early-stage drug discovery and development, particularly in developing countries,
- Stimulate global cooperation in R&D
- Encourage research on mechanisms of action and PK of natural products and traditional medicines. Evidence-based medicine.
- Capacity building for clinical trials, particularly in developing countries,
- Encourage development of regulatory affairs in developing countries
EDUCATION

Clinical Pharmacology Mentoring Centers
5 world-wide
Dissemination

• IUPHAR and NC-IUPHAR newsletters
• Receive email alerts for latest database updates and news
• Followers on Facebook LinkedIn WordPress Twitter @GuidetoPHARM @PharmacologyEd @IUPHAR
• Download slides and posters
• myIUPHAR intranet
IUPHAR Immunopharmacology/Antibody Group formed
Francesca Levi-Schaffer is chair (>60 members)
Wellcome immunopharmacology kinase grant in progress

<table>
<thead>
<tr>
<th>TARGET, inhibitors</th>
<th>WHICH IMMUNE DISEASES ?</th>
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<tbody>
<tr>
<td>Akt</td>
<td>Asthma</td>
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<tr>
<td>Multiple chemokine receptors</td>
<td>Rheumatoid arthritis</td>
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<td>INFα</td>
<td>Multiple sclerosis (IL17+)</td>
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<td>IL1</td>
<td>Aspects of schizophrenia</td>
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<td>IL6</td>
<td>Juvenile diabetes</td>
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<td>Mtor</td>
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<td>PI3K δ /γ</td>
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<td>Vitiligo</td>
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<td>TLR2/4/7/9</td>
<td>Myasthenia gravis</td>
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<td>TNFα</td>
<td>Systemic lupus erythematosus (SLE)</td>
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<tr>
<td>ROR-γ</td>
<td>Psoriasis</td>
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</table>

Immunopharmacology: Which target for which disease? Ongoing project.
An opportunity to contribute to a global initiative in clinical and preclinical healthcare and education, bridging the gap between preclinical molecular targets, translational medicine, clinical pharmacology, and aid pharmacology in developing countries. Wellcome Trust were interested.
Simplify complexity

With Pharmacology

IUPHAR and expert subcommittees
NC-IUPHAR, the Guide to PHARMACOLOGY database (GtoPdb) and Concise Guide

Adam Pawson, Steve Alexander
About NC-IUPHAR

The International Union of Basic and Clinical Pharmacology Committee on Receptor Nomenclature and Drug Classification
About NC-IUPHAR

Objectives:
• Issue guidelines for the nomenclature and classification of human biological targets
• Facilitate the designation of newly discovered sequences as functional biological targets and potential drug targets
• Designate the polymorphisms and variants which are functionally important
• Develop an authoritative and freely available, global online resource, the IUPHAR/BPS Guide to PHARMACOLOGY database (GtoPdb)

NC-IUPHAR expert reviews:
• Nomenclature articles published in Pharmacological Reviews
• ‘State-of-the-field’ review articles and editorials on varied topics published in the British Journal of Pharmacology
• Published by NC-IUPHAR members and NC-IUPHAR expert subcommittees
• Cumulative H-Index for NC-IUPHAR is 79
1. **INTERNATIONAL UNION OF PHARMACOLOGY CLASSIFICATION OF RECEPTORS FOR 5-HYDROXYTRYPTAMINE (SEROTONIN)**
   By: HOYER, D; CLARKE, DE; FOZARD, JR; et al.
   **PHARMACOLOGICAL REVIEWS** Volume: 46 Issue: 2 Pages: 157-203 Published: JUN 1994

2. **International Union of Pharmacology. XXV. Nomenclature and classification of adenosine receptors**
   By: Fredholm, BB; Ijzerman, AP; Jacobson, KA; et al.
   **PHARMACOLOGICAL REVIEWS** Volume: 53 Issue: 4 Pages: 527-552 Published: DEC 2001

3. **INTERNATIONAL UNION OF PHARMACOLOGY CLASSIFICATION OF PROSTANOID RECEPTORS - PROPERTIES, DISTRIBUTION, AND STRUCTURE OF THE RECEPTORS AND THEIR SUBTYPES**
   By: COLEMAN, RA; SMITH, WL; NARUMIYA, S
   **PHARMACOLOGICAL REVIEWS** Volume: 46 Issue: 2 Pages: 205-229 Published: JUN 1994

4. **International Union of Pharmacology. XXVII. Classification of cannabinoid receptors**
   By: Howlett, AC; Batlh, F; Bonier, T; et al.
   **PHARMACOLOGICAL REVIEWS** Volume: 54 Issue: 2 Pages: 161-202 Published: SEP 2002

5. **International union of pharmacology. XXIII. The angiotensin II receptors**
   By: de Gasparo, M; Catt, KJ; Inagami, T; et al.
   **PHARMACOLOGICAL REVIEWS** Volume: 52 Issue: 2 Pages: 145-176 Published: MAR 2000

6. **International union of pharmacology. XXII. Nomenclature for chemokine receptors**
   By: Murphy, PM; Baggiolini, M; Chao, IP; et al.
   **PHARMACOLOGICAL REVIEWS** Volume: 50 Issue: 2 Pages: 291-313 Published: JUN 1998

7. **International Union of Pharmacology. XV. Subtypes of gamma-aminobutyric acid(A) receptors: Classification on the basis of subunit structure and receptor function**
   By: Barnard, EA; Skolnick, P; Olsen, RW; et al.
   **PHARMACOLOGICAL REVIEWS** Volume: 50 Issue: 2 Pages: 279-293 Published: JUN 1998

8. **International Union of Pharmacology. XVII. Classification of muscarinic acetylcholine receptors**
   By: Caulfield, MP; Birdsell, NJM
   **PHARMACOLOGICAL REVIEWS** Volume: 50 Issue: 2 Pages: 279-293 Published: JUN 1998

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Recent extensions of NC-IUPHAR

- Immunopharmacology
- Antibodies
- Kinases
- Orphan Diseases (collaboration with Orphanet)
- Proteases and hydrolases
- Epigenetic targets
- Natural Products
- Allostery
- Alternative Splicing
- Academic Drug Discovery
NC-IUPHAR membership (1)

Core committee:

Executive Committee
Stephen Alexander, UK - Chair
Arthur Christopoulos, Australia - Deputy Chair
Anthony Davenport, UK - Funding Liaison
Doriano Fabbro, Switzerland - Industry Liaison
Adam Pawson, UK - Executive Secretary

Core Members
Stephen Alexander, UK
Arthur Christopoulos, Australia - GPCRs Liaison
John Cidlowski, USA - NHRs Liaison
Anthony Davenport, UK - Chair Evolving Pharmacology, GPCRs Liaison
Doriano Fabbro, Switzerland
Kozo Kaibuchi, Japan
Yoshikatsu Kanai, Japan
Francesca Levi-Schaffer, Israel
Eliot Ohlstein, USA - Editor
Joerg Striessnig, Austria - VGICs Liaison
John Peters, UK - LGICs Liaison
Alex Phipps, UK

Ex Officio Members
Sam Enna, USA - IUPHAR President
Michael Spedding, France - IUPHAR Secretary-General
Petra Thürmann, Germany - IUPHAR Treasurer
Simon Maxwell, UK - Educational Site Project Leader
Jamie Davies, UK - Database Chair/Principal Investigator
Joanna Sharman, UK - Senior Database Developer
Simon Harding, UK - Database Developer, Immunopharmacology
Adam Pawson, UK - Senior Database Curator
Elena Faccenda, UK - Database Curator
Christopher Southan, Sweden - Senior Cheminformatician/Curator
Toni Wigglesworth, UK - Project Administrator
Elspeth Bruford, UK - HGNC Group Coordinator
Amrita Ahluwalia, UK - BJP Editor-in-Chief

Past Chairs (ex officio)
Paul Vanhoutte, China
Robert Ruffolo, USA

Clinical Translational Pharmacology Group
Ed Bullmore, UK
Sir Colin T. Dollery, UK (Founder and Past Core Member)
Robert Dow, UK
Garrett Fitzgerald, USA
Alex Phipps, UK
Patrick du Souich, Canada
David Webb, UK
Don Birkett, Australia
NC-IUPHAR membership (2)

Corresponding Members:

Susan Amara, USA
Tom Bonner, USA (Past Core Member)
Michel Bouvier, Canada
Thomas Burris, USA
William Catterall, USA (Past Core Member)
Steven Charlton, UK
Moses Chao, USA
Mark Coles, UK
Steven L. Colletti, USA
Graham Collingridge, UK
Sir Colin T. Dollery, UK (Founder and Past Core Member)
Richard Eglen, UK
Steven Foord, UK
David Gloriam, Denmark
Gillian Gray, UK
Debbie Hay, New Zealand
Allyn Howlett, USA
Franz Hofmann, Germany
Yu Huang, Hong Kong
Ad P. Ijzerman, The Netherlands
Michael F. Jarvis, USA
Bong-Kiun Kaang, Korea
Eamonn Kelly, UK
Terry Kenakin, USA
Janos Kiss, Hungary
Stefan Knapp, Germany
Andrew Knight, UK
Chris Langmead, Australia
Vincent Laudet, France (Past Core Member)
Margaret (Mandy) MacLean, UK
Neil Marrion, UK
Fiona Marshall, UK
Alistair Mathie, UK
Ian McGrath, UK
Graeme Milligan, UK
Rick Neubig, USA (Past Core Member)
Stefan Offermanns, Germany
Richard Olsen, USA
Jean-Philippe Pin, France (Past Core Member)
Helgi Schiöth, Sweden
Graeme Semple, USA
David Searls, USA
Roland Staal, USA
Bart Staels, France
Katerina Tiligarda, Greece
Georg Terstappen, Germany
Mary Vore, USA
NC-IUPHAR subcommittees

NC-IUPHAR Subcommittee Chairs/Liaisons (>90 subcommittees; ~850 scientists)

G protein-coupled receptors Subcommittees
5-Hydroxytryptamine: Nick Barnes, John Neumaier
alpha3-adenoreceptors: Dianne Perez
Apelin: Anthony Davenport
Bombesin: Robert Jensen
Calcium-sensing: Katie Leach, Hans Bräuner-Osborne
Cholecystokinin: Laurence Miller
Dopamine: Raul Gainetdinov
Formylpeptide family: Richard Ye
GABA\textsubscript{\alpha}2: Bernhard Bettler
Glucagon receptor family: Laurence Miller
Histamine: Paul Chazot
Leukotriene: Magnus Bäck
Melanin-concentrating hormone: Jean-Louis Nahon
Metabotropic glutamate: Cyril Goudet
Neuropeptide FF/neuropeptide AF: Jean-Marie Zajac
Neuropeptide Y: Dan Larhammar
Orexin: Christopher Winrow
Peptide P518: Jerome Leprince
Prolactin-releasing peptide: Helgi Schiöth
Relaxin family peptide: Roger Summers
Tachykinin: Susan Leeman, Steven Douglas
Urotensin: Hubert Vaudry

Ligand-gated ion channels Subcommittees
John Peters (Liaison for all LGIC subcommittees)
5-HT\textsubscript{3}R: John Peters
GABA\textsubscript{\alpha}3: Richard Olsen
Glycine: Joseph Lynch
Ionotropic glutamate: Graham Collingridge
Nicotinic acetylcholine: Neil Millar
P2X: Charles Kennedy
ZAC: Timothy Hales

Antibodies Subcommittee
Alex Phipps

Adenylyl cyclases Subcommittee
Carmen Dessauer

Drug Target and Chemistry Curation Subcommittee
Christopher Southan

Epigenetics Subcommittee
Rabinder Prinjha, Doriano Fabbro

Acetylcholine (muscarinic): Arthur Christopoulos
alpha3, -adenoreceptors: VACANT
beta-adenoreceptors: Terry Hébert
Bradykinin: VACANT
Cannabinoid: Roger Pertwee, Allyn Howlett
Complement peptide: Peter Monk
Endothelin: Anthony Davenport
Free fatty acid: Graeme Milligan
Galanin: Andrew Gundlach
Glycoprotein hormone: Deborah Segalloff
Hydroxycarboxylic acid: Stefan Offermanns
Lysophospholipid (LPA): Jerold Chung
Melanocortin: Tung Fong, Helgi Schiöth
Motilin: Anthony Davenport
Neuropeptide S: Girolamo Calò
Neurotensin: Jean Mazella
P2Y: Geoffrey Burnstock
Platelet-activating factor: VACANT
Prostanoid: Xavier Norel
Relaxin-like: Nick Barker
Trace amine: Janet Maguire
Vasopressin and oxytocin: Bernard Mouillac

Voltage-gated ion channels Subcommittees
Joerg Striessnig (Liaison for all VGIC subcommittees)
Calcium-activated potassium: George Gutman
CatSper and Two-Pore: David Chapman
Inwardly rectifying potassium: Yoshihiro Kubo
Transient Receptor Potential: David Clapham
Two P potassium: Steven Goldstein
Voltage-gated calcium: William Catterall
Voltage-gated potassium: George Gutman
Voltage-gated sodium: William Catterall

Gasotransmitters Subcommittee
Andreas Papapetropoulos and Csaba Szabó

Guanylyl cyclases Subcommittee
Adrian Hobbs and Scott Waldman

Non-coding RNAs Subcommittee
Andrew Baker

Adenosine: Adriaan Ijzerman
Angiotensin: Sadashiva Karnik
Bile acid: Anthony Davenport
Calcitonin: Debbie Hay, David Poyner
Chemokine: Philip Murphy
Corticotropin-releasing factor: Richard Hauger, Frank Dautzenberg
Estrogen (G protein coupled): Eric Prosnitz
Frizzled: Gunnar Schulte
Ghrelin: Birgitte Holst
Gonadotrophin-releasing hormone: Adriaan Ijzerman
Kisspeptin: Anthony Davenport
Lysophospholipid (S1P): Sarah Spiegel
Melatonin: Ralf Jockers
Neuropeptide W/neuropeptide AF: Jean Drapeau
Neuropeptide FF/neuropeptide B: Anthony Davenport
Opioid: Larry Toll
Parathyroid hormone: Jean-Pierre Vladovec
Prokineticin: Philippe Rondard
Protease-activated receptor: William Catterall
Somatostatin: Stephan Schulz
Thryotropin-releasing hormone: Virginia De Mey
VIP and PACAP: Joseph Piesig

Nuclear hormone receptors Subcommittees
John Cidlowski and Thomas Burris (Liaisons for all NHR subcommittees)
NHR subcommittees are currently being reformed

Kinases Subcommittee
Doriano Fabbro

Pattern Recognition Receptors Subcommittee
Clare Bryant

Proteases Subcommittee
Anthony Turner

‘Concise Guide to PHARMACOLOGY’ Editors
Stephen Alexander, Eamonn Kelly, Neil Marrion, John Peters
About GtoPdb
www.guidetopharmacology.org
About GtoPdb

The Guide to PHARMACOLOGY database (GtoPdb) aims to:

• Provide access to data on all known human biological targets
• Make recommendations on ligands for use in characterising those targets
• Provide an entry point into the pharmacological literature
• Provide an integrated educational resource with high quality training in the principles of basic and clinical pharmacology and techniques
• Foster innovative drug discovery

• Development of GtoPdb is overseen by NC-IUPHAR
GtoPdb content

Current database content for version 2017.1 released 26th January 2017
GtoPdb content – targets

2797 established or potential drug targets and related proteins:

• G protein-coupled receptors (Class A, B, C, frizzled, adhesion and orphan GPCRs)
• Ligand-gated ion channels
• Voltage-gated ion channels
• Other ion channels
• Nuclear hormone receptors
• Catalytic receptors
• Kinases
• Proteases
• Other enzymes
• Transporters
• Other protein targets
8765 ligands, drugs, antibodies:

- Approved drugs
- Synthetic organic compounds
- Metabolites, hormones, neurotransmitters
- Natural products
- Endogenous peptides
- Other peptides
- Inorganics
- Antibodies
- Labelled ligands

GtoPdb content – ligands
The Concise Guide to PHARMACOLOGY

www.guidetopharmacology.org/concise
The Concise Guide to PHARMACOLOGY

• **Snapshot** of the concise target family summaries in GtoPdb

• Published **biennially** as a supplement to the *British Journal of Pharmacology*, as a series of PDFs

• Intended to be a quick desktop **reference guide**

• Lists the **key properties** and tool compounds for characterising targets

• PDF files include **embedded hyperlinks** from:
  - gene names and UniProt IDs to HGNC and UniProt entries, respectively
  - target and ligand names direct to entries in GtoPdb
  - PubMed IDs direct to PubMed citations

• **Download for free** at
  [http://www.guidetopharmacology.org/concise](http://www.guidetopharmacology.org/concise)
Histamine receptors

Overview: Histamine receptors (nomenclature as agreed by IUPHAR Subcommittee on Histamine Receptors, [1003]) are activated by the endogenous ligand histamine. Marked species differences exist between histamine receptor orthologues (see [1003]).

<table>
<thead>
<tr>
<th>Histamine receptors</th>
<th>H&lt;sub&gt;1&lt;/sub&gt; receptor</th>
<th>H&lt;sub&gt;2&lt;/sub&gt; receptor</th>
<th>H&lt;sub&gt;3&lt;/sub&gt; receptor</th>
<th>H&lt;sub&gt;4&lt;/sub&gt; receptor</th>
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<tr>
<td>Nomenclature</td>
<td>HRH&lt;sub&gt;1&lt;/sub&gt;, P35367</td>
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<td>HRH&lt;sub&gt;3&lt;/sub&gt;, Q9Y5N1</td>
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<td>Principal transduction</td>
<td>G&lt;sub&gt;q&lt;/sub&gt;, G&lt;sub&gt;12&lt;/sub&gt;, G&lt;sub&gt;13&lt;/sub&gt;</td>
<td>G&lt;sub&gt;a&lt;/sub&gt;, G&lt;sub&gt;12,13&lt;/sub&gt;</td>
<td>G&lt;sub&gt;q&lt;/sub&gt;, G&lt;sub&gt;12,13&lt;/sub&gt;</td>
<td>G&lt;sub&gt;q&lt;/sub&gt;, G&lt;sub&gt;12,13&lt;/sub&gt;</td>
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<td>Selective agonists (pK&lt;sub&gt;a&lt;/sub&gt;)</td>
<td>methylhistadoline (6.4) [1025], histadoline (5.7) [1013]</td>
<td>amantadine (pEC&lt;sub&gt;a&lt;/sub&gt; 6.4) [1008]</td>
<td>immethadine (9.1) [1007], methimep (9.0) [1006]</td>
<td>cloberoproil (Partial agonist) (7.4 – 8.3) [1000,1013-1015,1019], 4-methylhistadine (7.3 – 8.2) [1001,1013], VUF 8430 (7.5) [1012]</td>
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<tr>
<td>Selective antagonists (pK&lt;sub&gt;a&lt;/sub&gt;)</td>
<td>pyrilamine (Inverse agonist) (8.7 – 9.0) [995,1023], triprolidine (8.5 – 9.0) [995,1017]</td>
<td>tiotidine (7.5 - Rat) [994], ranitidine (7.1) [1010]</td>
<td>cloberoproil (8.4 – 9.4) [997,1000,1011,1014,1016,1028-1029], A331440 (8.5) [1002], lodopropanol (8.2 – 8.7) [1028-1029], chlorpromazine (7.1 – 7.7) [997,1000,1011,1016,1028-1029]</td>
<td>[H]&lt;sup&gt;1&lt;/sup&gt;Hij 19777120 (Antagonist) (3.6x10&lt;sup&gt;-6&lt;/sup&gt; M) [1027]</td>
</tr>
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<td>Radioligands (K&lt;sub&gt;a&lt;/sub&gt;)</td>
<td>[11C]pyrilamine, [11C]dexamfetamine (Antagonist) (1x10&lt;sup&gt;-6&lt;/sup&gt; M) [1004], [11C]pyrilamine (Antagonist) (7.9x10&lt;sup&gt;-9&lt;/sup&gt; – 4x10&lt;sup&gt;-8&lt;/sup&gt; M) [998,1017,1024-1025]</td>
<td>[11C]lumiprost (Antagonist) (2x10&lt;sup&gt;-7&lt;/sup&gt; M - Rat) [1009], [11C]tiotidine (Antagonist) (2.2x10&lt;sup&gt;-9&lt;/sup&gt; – 2x10&lt;sup&gt;-8&lt;/sup&gt; M) [1018]</td>
<td>[11C]lumiprost (Antagonist) (6.3x10&lt;sup&gt;-11&lt;/sup&gt; M) [1011], [11C]lodopropanol (Antagonist) (6x10&lt;sup&gt;-10&lt;/sup&gt; M - Rat) [1005], [H]&lt;sup&gt;1&lt;/sup&gt;Hij 19777120 (Antagonist) (3.6x10&lt;sup&gt;-6&lt;/sup&gt; M) [1027]</td>
<td>[H]&lt;sup&gt;1&lt;/sup&gt;Hij 19777120 (Antagonist) (3.6x10&lt;sup&gt;-6&lt;/sup&gt; M) [1027]</td>
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Comments: Histadoline and methylhistadoline are reduced efficacy agonists. The H<sub>4</sub> receptor appears to exhibit broadly similar pharmacology to the H<sub>3</sub> receptor for imidazole-containing ligands, although (R)-methylhistadine and N,N-methylhistadine are less potent, while cloberoproil acts as a reduced efficacy agonist [1014,1020-1022,1030]. Moreover, 4-methylhistadine is identified as a high affinity, full agonist for the human H<sub>4</sub> receptor [1013]. [H]<sup>1</sup>Hj histamine has been used to label the H<sub>4</sub> receptor in heterologous expression systems.

Further reading

Database developmental aspects

Joanna Sharman
IUPHAR/BPS Guide to PHARMACOLOGY (GtoPdb) website: Home Page

Dr Joanna Sharman, University of Edinburgh

An expert-driven guide to pharmacological targets and the substances that act on them.

Targets
- G protein-coupled receptors
- Ion channels
- Nuclear hormone receptors
- Kinases
- Catalytic receptors
- Transporters
- Enzymes
- Other protein targets

View full release details...

Ligands
- Approved drugs
- Synthetic organics
- Metabolites
- Natural products
- Endogenous peptides
- Other peptides
- Inorganics
- Antibodies
- Labelled ligands

Search for ligands...

Latest News
Database release 2017.1
We are pleased to announce our first database release of 2017 on 26th Jan 2017. While there are no major updates in this release, it includes several bug fixes and new ligands of relevance to immunopharmacology. Full details available on our blog...

Jan 26, 2017 11:25 AM

IUPHAR review 100 in Pharm Revs and review 21 in BJ
Two new IUPHAR reviews have been published online in January 2017. The first is the 100th in Pharmacological Reviews - a review on the nomenclature...
Jan 20, 2017 10:58 AM

Hot topics: The orphan GPR139 receptor is activated ...
GPR139 is an orphan class A G protein-coupled receptor found mainly in the central nervous system. It has its highest...
IUPHAR/BPS Guide to PHARMACOLOGY (GtoPdb) website:

- Targets
  - Target classes
    - G protein-coupled receptors (GPCRs)
    - Nuclear hormone receptors (NHRs)
    - Catalytic receptors
    - Enzymes
  - Ion channels
    - Voltage-gated ion channels
    - Cation-selective non-selective ion channels
    - Ligand-gated ion channels
  - Other protein targets
    - Kinases
    - Transporters
    - Other protein families
  - Family summary
    - 5-HT₃ receptors
  - Detailed target page
    - 5-HT₃ receptors
      - Target ID: 379
      - Nomenclature: 5-HT₃A/B
      - Functional characteristics
        - y = 0.0498 x (1 - 0.555)
        - Relative permeability to sodium current reduced by 0.555
      - Antagonists and agonists
        - Antagonists
          - Pargyline
          - (S)-zopiclone
          - Metoclopramide
          - Cocaine
          - Lidocaine
        - Agonists
          - Propranolol
          - (S)-zopiclone
          - Metoclopramide
          - Cocaine
          - Lidocaine
      - Click column headers to sort

Data indicates that the (S)-zopiclone binding to the human recombinant 5-HT₃A receptor expressed in mammalian cells. Selectivity refers to the 5-HT₃ receptor family; the agents listed do not discriminate between 5-HT₃A and 5-HT₃B receptor subtypes in radioligand binding assays. However, in electrophysiological studies, (S)-zopiclone demonstrates selectivity for human 5-HT₃A receptors (IC₅₀ = 346 µM) versus human 5-HT₃B receptors (IC₅₀ = 13-21 µM) receptors. A novel potent blocker by (S)-zopiclone, although with reduced selectivity, is apparent for the 5-HT₃A and 5-HT₃B receptors.
IUPHAR/BPS Guide to PHARMACOLOGY: Architecture and Other Resources

Website: www.guidetopharmacology.org

Downloadable files and lists

Web services serving up data in JSON format

Tutorial, help and FAQ; Teaching resources: generic slide sets and posters

Most data stored in a PostgreSQL database; chemical data stored in an Oracle database

Automated extraction of target summaries for publication in Concise Guide to Pharmacology

New portal to immunopharmacology data under development

RDF describing target-ligand interaction data (in progress) – standard format for data interchange
The new Guide to IMMUNOPHARMACOLOGY database (GtoImmuPdb) initiative

Simon Harding, Jamie Davies
Many diseases have, or depend strongly on, an immune or inflammatory component.

Development of drugs to modulate these components is of great value.

Will benefit from improving data exchange between pharmacology and immunology.

- Wellcome Trust-funded extension to the existing GtoPdb
- Unique portal to immunological data in the GtoPdb
- Open-access and regularly updated
- New ways to search, browse and visualise immunological data
Existing database will be enriched with new immunological data
- Targets and ligands of immuno relevance will be tagged
- Links to new annotated data on immunological processes, cell types and diseases

- Making use of existing biological ontologies for annotation and interoperability
- New data curated by expert sub-committees at NC-IUPHAR
- Public, beta-version, due for release in Spring 2017
The IUPHAR Pharmacology Education Project (PEP)
www.pharmacologyeducation.org

John Szarek
Organization

• International Editorial Board
  • US, AU, DE, CN, SG, UK

• Leadership
  • John L. Szarek, PhD, CHSE
    Geisinger Commonwealth School of Medicine
  • Professor Simon Maxwell MD PhD
    University of Edinburgh
  • Elena Faccenda, PhD
    University of Edinburgh
Pharmacodynamics is the study of how drugs have effects on the body. The most common mechanism is by the interaction of the drug with tissue receptors located either in cell membranes or in the intracellular fluid. The extent of receptor activation, and the subsequent biological response, is related to the concentration of the activating drug (the 'agonist'). This relationship is described by the dose–response curve, which plots the drug dose (or concentration) against its effect. This important pharmacodynamic relationship can be influenced by patient factors (e.g. age, disease) and by the presence of other drugs that compete for binding at the same receptor (e.g. receptor 'antagonists'). Some drugs acting at the same receptor (or tissue) differ in the magnitude of the biological responses that they can achieve (i.e. their 'efficacy') and the amount of the drug required to achieve a response (i.e. their 'potency'). Drug receptors can be classified on the basis of their selective response to different drugs. Constant exposure of receptors or body systems to drugs sometimes leads to a reduced response (i.e. 'desensitization').

Therapeutic index

Receptor selectivity

Efficacy and potency
When drugs are used in clinical practice, the prescriber is unable to construct a careful dose-response curve for each individual patient. Therefore, most drugs are licensed for use within a recommended dose range that is expected to be close to the top of the dose-response curve for most patients. This ensures that most patients will achieve a good clinical response without the need for frequent review and dose increases. However, this means that it is sometimes possible to achieve the desired therapeutic response at doses towards the lower end of the recommended range (or below).

The adverse effects of drugs are often dose-related in a similar way to the beneficial effects. It is possible to construct a dose-response curve for these adverse effects in the same way as shown for the beneficial effects, with higher doses usually required to 

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This is the fourth in a series of 4 simulations related to dose-response relationships. This simulation focuses on therapeutic index. In this simulation the learner can vary the therapeutic index by the use of a slider and observe the effects on the relative positions of the dose-response curves for the desired and adverse effects. This is a more kinesthetic approach to illustrating these concepts in that it allows the learner to experiment. Although targeted for early learners in pharmacology, students should have a basic understanding of the concepts before using the simulation.
Use

- APR-16: 373,214
- MAY-16: 420,284
- JUN-16: 688,472
- JUL-16: 577,360
- AUG-16: 864,643
- SEP-16: 1,062,750
- OCT-16: 2,189
- NOV-16: 1,679
- DEC-16: 2,248
- JAN-17: 2,447

Legend:
- Blue bars: sessions
- Purple bars: new users
World-wide use
Future plans - Get Involved!

• Use the site & encourage others to use it
  www.pharmacologyeducation.org

• Contribute content to the site
  http://www.pharmacologyeducation.org/contribute-project

• Follow us on Twitter
  @PharmacologyEd

• Contact us
  Admin@pharmacologyeducation.org
  jszarek@tcmc.edu
Main IUPHAR website
Lynn LeCount
IUPHAR is a voluntary, non-profit association of pharmacology societies representing the interests of pharmacologists world-wide.
Public Portal

Webdeveloper Robert Fuchs helped us deliver...

A single portal to all online resources

≤ 3 clicks to most resources

Minimal graphics to ensure quick loading time

Migrating from Joomla 2.2 to 3.6
Behind the Firewall

myIUPHAR social media offers…

Vanity URLs, avatars, posting, etc.

Can invite users outside system

Users may select language

Migrating JomSocial 3.2 to 4.2
Administration

Joomla content editor allows...

- Embedded subwebsites & subdomains with their own webmasters
- Assign users to groups for targeted communication
- AcyMailing newsletters
- Easily changed menu structure
Database

IUPHAR needs to track constantly changing...

- committees
- invoice recipients
- voting delegates
- member societies’ officers
- Division / Sections / Subcommittees’ officers
The Challenge:

In its default fields, the JomSocial software couldn’t accommodate multiple roles and terms of office for the same person
The Answer:

Robert customized (ungrouped) the JomSocial database to facilitate four sub-profiles in addition to the default profile in the JomSocial database.
Robert built a query form to permit *ad hoc* data, which is available to the members of the IUPHAR Executive Committee.
In Practice:

I run periodic reports to learn which officers’ terms have expired in order to track down who was recently elected.
Back to you, Michael!
Questions