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NC-IUPHAR / IUPHAR-DB Newsletter

IUPHAR International Union of Basic and Clinical Pharmacology

Dear Contributor

Welcome to the second annual newsletter highlighting some of our recent activities and bringing to your attention several exciting new developments to NC-IUPHAR and the IUPHAR database (IUPHAR-DB: http://www.iuphar-db.org).

The past year has seen the continuing evolution of NC-IUPHAR along with major enhancements to IUPHAR-DB. Significantly, our joint initiative with the British Pharmacological Society (BPS) has led to the recent launch of the new open access Guide to PHARMACOLOGY portal (http://www.guidetopharmacology.org), which integrates IUPHAR-DB and the BPS *Guide to Receptors and Channel*s (GRAC). This is a major achievement and will ultimately provide a unique, authoritative global resource intelligible to all members of the scientific community to maximise our expanding knowledge of all the major receptor and ion channel systems, extending to the impact of how druggable genes affect health and disease.

Recent enhancements to IUPHAR-DB

The annotation of sequences, structural and protein precursor data, and database links for the endogenous peptide ligands of 39 GPCR families has been completed. In a *pilot* study on the curation of enzymes as drug targets we have created database pages for the 10 enzymes of the lanosterol biosynthesis pathway, including HMG CoA reductase the target of the statin drugs used in the treatment of hypercholesterolaemia.

The database search interface has also been enhanced, allowing for navigation of the ligand chemical structure space covered by IUPHAR-DB and GRAC through text, identity, similarity, substructure and SMARTS-pattern queries.

New external database links have been added. We now link to DrugBank target pages, giving information on approved drugs which act on them, and the Human Metabolome Database (HMDB) containing detailed information about small molecule metabolites found in the human body. Where available, links have been provided from GPCR, ion channel and NHR pages to genes in Orphanet, the Portal for Rare Diseases and Orphan Drugs. Links have been added from ligand pages to BindingDB, a public database of measured binding affinities, focusing mainly on proteins considered to be drug targets and small, drug-like molecules. The enzyme pages link to BRENDA, the Comprehensive Enzyme Information System, and KEGG, the Kyoto Encyclopedia of Genes and Genomes, which contains pathway, gene and chemical information, and the IUBMB Enzyme Nomenclature database.

Receptor families recently updated on the database include the β-Adrenoceptors, Calcitonin receptors, Cannabinoid receptors and Orexin receptors. The curators have been able to coordinate directly with all the NC-IUPHAR subcommittees and we thank you all for your active implication in this project.

The new Guide to PHARMACOLOGY portal

www.guidetopharmacology.org was officially launched on the 2nd December 2011 as a portal which integrates IUPHAR-DB and the BPS *Guide to Receptors and Channel*s (GRAC). This will be expanded to cover the entire field of pharmacology so please visit the site, send us your comments, and tell all your colleagues, post-docs and students about this valuable new resource.

Publications

As you know, NC-IUPHAR benefits from a privileged relationship with ASPET and BPS, with core nomenclature articles appearing in *Pharmacological Reviews,* while a new series of general 'state-of-the-field' review articles are published (alongside database updates) in the *British Journal of Pharmacology (BJP)*. Five NC-IUPHAR nomenclature articles have appeared in *Pharmacological Reviews* so far during the 2011-2012 period, reflecting the activity of NC-IUPHAR. The inaugural NC-IUPHAR commissioned review for the *BJP* has also recently been published by Harmar *et al*, entitled 'IUPHAR Reviews 1: Pharmacology and functions of receptors for vasoactive intestinal peptide and pituitary adenylate cyclase-activating polypeptide'.

Key points of discussion at the recent joint NC-IUPHAR/GRAC meeting in Paris

Current status of IUPHAR-DB and its integration into the Guide to PHARMACOLOGY portal; the pharmacological classification of transporters; new initiatives and delivering the annotation of new drug targets in epigenetics, tyrosine kinases, transporters, microRNAs and antibodies; recent progress on allostery and biased signalling; the programme for the NC-IUPHAR symposia at the 17th World Congress of Basic and Clinical Pharmacology, Cape Town, South Africa, 2014.

Future

Further details of planned future developments to IUPHAR-DB, Guide to PHARMACOLOGY and NC-IUPHAR can be found in the NC-IUPHAR 2012 annual report (accessed at http://www.iuphar-db.org/AboutNC-IUPHAR.pdf).

Special request

To help us keep the database up to date, please check the status of your receptors of interest, and inform us if updates are required or not. Thank you very much for your ongoing support and help with NC-IUPHAR and curating IUPHAR-DB. We welcome any comments and suggestions.

From the database curators (curators@iuphar-db.org), Tony Harmar (IUPHAR-DB Chairman), and Michael Spedding (NC-IUPHAR Chairman)

Latest Database Statistics

- IUPHAR-DB now covers 627 human genes including 359 GPCRs, 140 VGICs, 70 LGICs, 48 NHRs, 10 enzymes and their rodent orthologues
- >2950 distinct ligand molecules
- 650 endogenous peptide ligands of 39 GPCR families
- >440 approved drugs, and WHO designated INNs for drugs where the compound is an active ingredient
- >7250 interactions between protein targets and distinct ligand molecules
- 135,000 visits from 159 countries per year
- Guide to PHARMACOLOGY covers an extended list of targets including Catalytic receptors, Transporters and Enzymes
- In the 4 months since its launch it has received 6400 visits from 107 countries