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Guide to Immunopharmacology: a database to boost immunology education, research and therapy

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Summary

In the era of big data, the establishment of a free database, containing all the immune drug targets and associated cell types, is of great value. To this aim, the Guide to Immunopharmacology has been created in a joint effort between the International Union of Basic and Clinical Pharmacology (IUPHAR) and the International Union of Immunological Societies (IUIS). Here we highlight the structure and content of the database, which includes up-to-date quantitative information on the fundamental science underlying each immune target. A set of practical examples and tools for data mining are summarized to support immune research into drug discovery and therapeutics.

Recent and emerging events have highlighted the immense need to link pharmacological and immunological research, and accelerate the development of antiviral and immunomodulatory drugs. Access to freely accessible databases can strongly contribute to immunology research and provide a foundation to scientists and clinicians for developing novel research tolls and therapeutics for immune and infectious diseases.

In this issue of *Immunology*, we highlight and discuss one of the latest of those database resources, the Guide to Immunopharmacology (GtoImmuPdb; www.guidetoimmunopharmacology.org).[1] The guide has been created, developed and maintained by the International Union of Basic and Clinical Pharmacology (IUPHAR) and the British Pharmacological Society (BPS), in collaboration with the International Union of Immunological Societies (IUIS). The database was initially established with the support of the Wellcome Trust.

This is the first guide specifically designed to cover the pharmacology of the immune system.[2–7] GtoImmuPdb builds on Guide to Pharmacology (GtoPdb, www.guidetopharmacology.org),[8] a long-established dataset containing quantitative information on most of the clinical and experimental drug targets and the medications acting on them.

The GtoImmuPdb is manually curated and constantly updated with support from a broad range of class-specific IUPHAR Nomenclature subcommittees, comprising over 500 scientists. To date, 618 targets and 1277 ligands have been included in GtoImmuPdb, based on the evidence that their activity has an effect on the immune system and/or the inflammatory response. Importantly, the data on targets and ligands have been organized by immunological processes, cell types, and disease, with the specific aim to bring valuable and easily accessible data into the hands of immunology researchers and clinicians.

As for any database, data mining may be challenging. For this reason, we are also publishing a review article[1] that has been specifically designed to help the reader navigate the resource, using a straightforward, step-by-step approach, and providing an exemplary case study. For each immune-inflammatory ligand or receptor, the reader can access curator comments on the association to immune-related disease, details on the drug if approved for clinical use, clinical trials, trade names, synonyms, international nonproprietary names (INNs), and tools to assess the biological activity and molecular mechanisms. Finally, the case study is designed to illustrate the usefulness of GtoImmuPdb to identify novel targets for the treatment of vascular inflammation. Similar approaches could be used for the study and identification of potential new targets for Covid-19, or any other immune disease/process of interest to the readers. It is worth noting that

the Guide to Pharmacology has a continually updating list of the drugs and targets being proposed or tested for use in Covid-19 (https://www.guidetopharmacology.org/coronavirus.jsp).

The GtoImmuPdb may also be used as a very effective educational tool and a medium to simplify and standardize immunology-related vocabulary for younger generations, scientists and clinicians. In fact, links from key ligands in GtoImmuPdb have now been added to the clinical case studies hosted by Immunopaedia (https://www.immunopaedia.org.za/), the IUIS online platform for advancing global immunology education. In a parallel effort, for online teaching, the Pharmacology Education Project has been linked to IUIS' immunopaedia (https://www.pharmacologyeducation.org/pharmacology/immunopharmacology).

In conclusion, *Immunology* and our sister journal *Clinical and Experimental Immunology* are strongly committed to publishing high-quality research relating to new therapeutics[9-16] as well as to the provision of educational resources, and therefore we recommend the GtoImmuPdb database as a novel tool to accelerate research, education and drug discovery in immunology, infection and inflammation.

Author contribution

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Disclosures

There are no conflicts of interest to declare.

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