The Guide to IMMUNOPHARMACOLOGY (GtoImmuPdb) is a Wellcome Trust-funded extension to the existing Guide to PHARMACOLOGY (GtoPdb). The development of GtoImmuPdb aims to provide improved data exchange between immunology and pharmacology expert communities, so to better support research and development of drugs targeted at modulating immune, inflammatory or infectious components of disease.

The underlying GtoPdb schema has been extended to incorporate new immune system specific data types (such as processes and cell types) and the GtoPdb website has been developed to surface this new data and incorporate it into the existing search and browse mechanisms. A new Guide to IMMUNOPHARMACOLOGY portal has been developed, which serves as a unique immunological access-point to the Guide to PHARMACOLOGY.

http://www.guidetoimmunopharmacology.org

The portal has its own unique branding (header bar, logo and colour scheme) to distinguish it, but retains many of the layout features from the main GtoPdb site. This consistency should help users already familiar with GtoPdb to orientate themselves with the new GtoImmuPdb.

Users can familiarise themselves with the existing GtoPdb site by reading its website tutorial:

http://www.guidetopharmacology.org/GuidetoPHARMACOLOGY_Tutorial.pdf

The guide in this document gives an overview of the GtoImmuPdb portal, and illustrates the new additions to existing pages that have been developed for GtoImmuPdb.

Information on the new data incorporated into GtoImmuPdb is described in more detail in other documentation.

http://www.guidetoimmunopharmacology.org/immuno/immunoHelpPage.jsp#aboutData
The GtoImmuPdb portal provides a unique access point to data of immunological relevance held in the database.

The main panels (highlighted by the dotted line) are fast routes into browsing the data by the main data-type categories:

- Processes
- Cell Types
- Disease
- Targets
- Ligands

These are explained in more detail later in the tutorial. Click on the category to jump to that section.

The menu bar can also be used to browse the different data types. It also provides background information under the About tab and help documentation under Resources. These also contain information about the parent GtoPdb resource.

The site search in the top right can be used to search across all data. The predictive text feature provides suggestion. View tutorial on searching GtolmmuPdb. When searching from the Guide to IMMUNOPHARMACOLOGY results will be up-weighted based on their immuno relevance (see Help on Searching GtolmmuPdb).
To view targets associated with immunological processes, select a process category from the 'Processes/pathways' panel on the GtoImmuPdb portal.

You can also select a category under the Processes menu item.

The list of targets is split by target class. The 'Jump to' links allow you to move fast to that section of the table.

The blue pull-down menu can be used to switch between different process categories.

The table lists the target name (and family) and links to its detailed target page.

Gene Ontology annotations (GO) are displayed plus general curated immunopharmacology comments related to the target.
To view targets associated with immunological cell types, select a cell type category from the 'Cell Types' panel on the GtoImmuPdb portal.

You can also select a category under the Cell Types menu item.

The list of targets is split by target class. The 'Jump to' links allow you to move fast to that section of the table.

The blue pull-down menu can be used to switch between different cell type categories.

The table lists the target name (and family) and links to its detailed target page.

Cell Ontology annotations are displayed plus general curated immunopharmacology comments related to the target.
Disease association data is via the Disease List page. These are accessed by selecting the link from the Disease panel on the portal or via the Disease menu item.

The page is organised with a tab to switch (1) between the disease categories.

Diseases are listed alphabetically (2). The disease name is listed in the first column (3). This links through to more detailed information on the Disease Summary page.

Synonyms are shown in the third column.

The final two columns (4) indicated how many targets and ligands have an association to that disease.
Disease summary pages show an overview of the disease at the top. This can include counts of associated targets and ligands, disease descriptions, synonyms and links to external database where we have mapped our disease to.

**Target section**
Displays any pathophysiology or mutation data curated against the target. Lists any ligands that are associated with the disease that interact with the target.

**Ligands section**
Lists associated ligands. Icons indicate if approved drug. Expandable comments section show curator, clinical use and bio-activity comments.
Users can browse for different targets by selecting one of the main target classes on the Targets panel. This links to the target families page for that class. Clicking on a family brings up the family page. The family page lists all targets for that family. There are links to the detailed view page for each target. The detailed view page shows all curated information about that target. Including highlighted immunological data.
1. Target families are displayed in a hierarchical tree (as in GtoPdb)

2. The target families page contains a toggle button that can be used to switch between the GtoImmuPdb view and the normal, GtoPdb view.

3. When selected toggle on, target families that contain target flagged in the database as being of immunological relevance
1. The family page also has a toggle to switch between GtoImmuPdb and GtoPdb

2. When switch on, target flagged as having immunological relevance are highlighted

3. Clicking the 'More detailed page' link moves to the detailed view for that target
1. The detailed view also has a toggle, and informs the user if the displayed target has been curated in GtoImmuPdb.

2. With the GtoImmuPdb view switched on, sections of immunological relevance are highlighted within the 'Contents' section – alerting the user to them. Clicking those jumps down to those sections..

3. When selected toggle on, target families that contain target flagged in the database as being of immunological relevance.
The immunopharmacology comments are rich, curator comments specific to the target about its relevance to immunopharmacology. Usually these will refers the targets involvement with different processes, cell types and disease.

Cell type associations shows one sub-section per top-level cell type category. Associations with specific Cell Ontology terms are shown along with curator comments and references.

Process associations shows one sub-section per top-level process category. Associations with specific Gene Ontology terms (and evidence codes) are shown along with curator comments and references.

Each sub-section gives details of the association between the target and a disease. It lists disease synonyms and curator comments. External links to other disease resources are provided.
Users can browse for different ligands by selecting one of the ligand categories on the Ligands panel.

Ligand categories can also be selected under the Ligands menu item.

The ligand list page is organised by category – which can be selected by the tabs at the top of the page (1).

Ligands are listed alphabetically, and link to their summary pages (2). Any ligands tagged in the database as being immuno relevance display the immuno icon (3).

All immuno tagged ligands are shown under the Immuno ligands tab.

A toggle button allows switching between the GtoImmuPdb and GtoPdb views (4).
The ligands summary pages contains detailed information about the ligand in GtoImmuPdb.

1. Tagged ligands have an Immunopharmacology tab that contains immuno relevant data.

2. The immunopharmacology comments sections contains specific curators comments about the ligands relevance to immunopharmacology.

3. The immunopharmacology disease section shows all immune-related diseases the ligand is associated with, including curator comments and external references for the disease.
Search mechanisms have been extended to incorporate all additional immunopharmacological data - this includes all process, cell type and disease terms, definitions and ontology IDs. Running searches on GtoImmuPdb will up-weight results of higher immunological relevance.

Example search results for 'regulation of cytokine production' shows hits against targets under the GtoImmuPdb process category 'Cytokine production & signalling'.

Example search results for 'Granulocytes' shows hits against targets under the GtoImmuPdb cell type category 'Granulocytes'.

Example search results for 'death associated protein kinase 2' (Death-associated kinase (DAPK) family) physiological function - description: regulates mobility of granulocytes in response to intermediaries but not end target chemotaxants ex vivo.

Example search results for 'spleen associated tyrosine kinase' (Styk family) physiological function - description: activates granulocytes in response to epinephrine.