CITEdb User Guide

Last update: April 8, 2022

Description of column names in the database

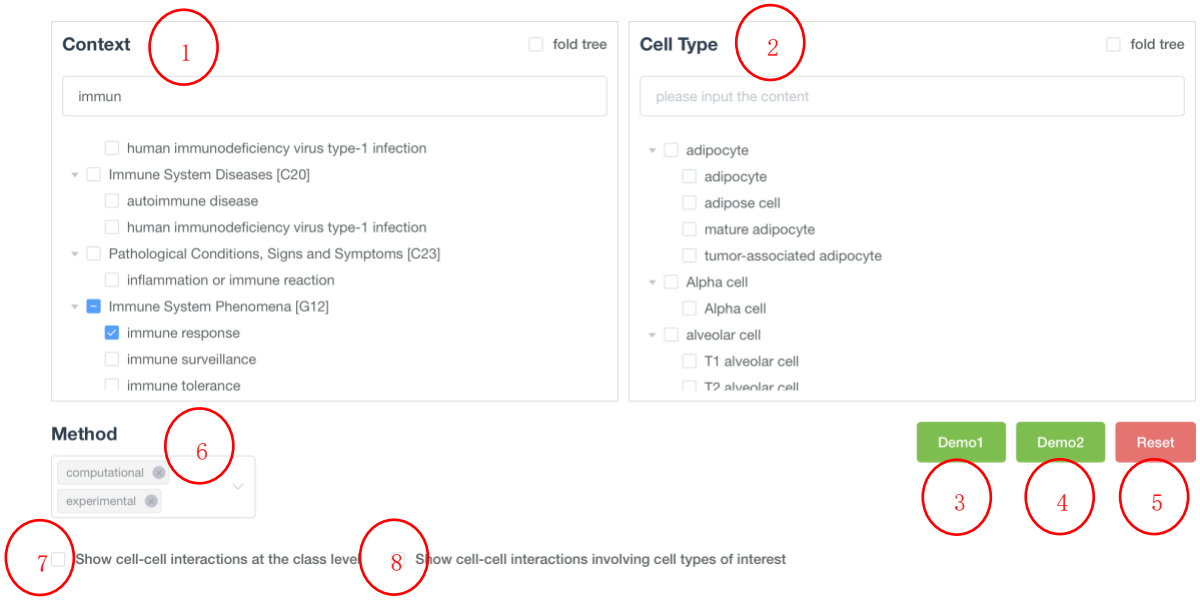
1) Publication year, PMID, and Title: the year that the paper is published, and the PubMed ID and title of the paper;
2) Full PDF and Information: whether full PDF document of the paper is available and whether the paper contains information of CITEs;
3) Organism: whether the interaction is found in human or other species;
4) Context: the context of the CITE (usually a disease or an organ);
5) MeSH term/ID: the categories of context based on MeSH (MeSH heading and tree number);
6) Phase, Tissue and Function: temporal and spatial details of the CITE, and its biological function
7) Source/Target cell type: the cell types involved in the CITE;
8) Source/Target cell type class: the categories of cell types based on CellMarker;
9) Clear direction and Reciprocal direction: whether the direction of CITE is clear, and whether it's reciprocal;
10) Interaction details: the mediator of the CITE;
11) Method (details): how did the paper obtain the CITE information;
12) Reference: where method (details) is from.

Search and Result help

1. Search help

users can not only search for all cell-cell interactions in the contexts of interest by selecting one or more contexts from the hierarchical tree of contexts (1), which can be viewed by clicking on the 'Demo1' button (3), but also explore specific cell-cell interactions involved with certain cell types from the hierarchical trees of cell types (2), which can be viewed by clicking on the 'Demo2' button (4), as well as selecting contexts and cell types simultaneously when specific cell-cell interactions in the specific contexts of interest can be obtained. In addition to selecting the whole candidate lists, searching with keyword with substring of the contexts or cell types is allowed for convenience, but keep in mind that this is case sensitive.

CITEdb can return cell-cell interactions of interest by selecting methods from the pull-down menu (6). While cell-cell interactions between selected cell types is returned by default, users can obtain cell-cell interactions involving any selected cell types by checking the box of 'Show cell-cell interactions involving cell types of interest'(8). Note that the box above could not work anymore when you search for all cell-cell interactions in specific contexts of interest. Additionally, as interaction networks between cell types may be too complicated, cell types can be integrated into cell type class by checking the box of the 'Show cell-cell interactions at the class level' (7), that is, only display a line if any cell type in one class (e.g., T cell) has an interaction with any cell type in the other class (e.g., epithelial cell).

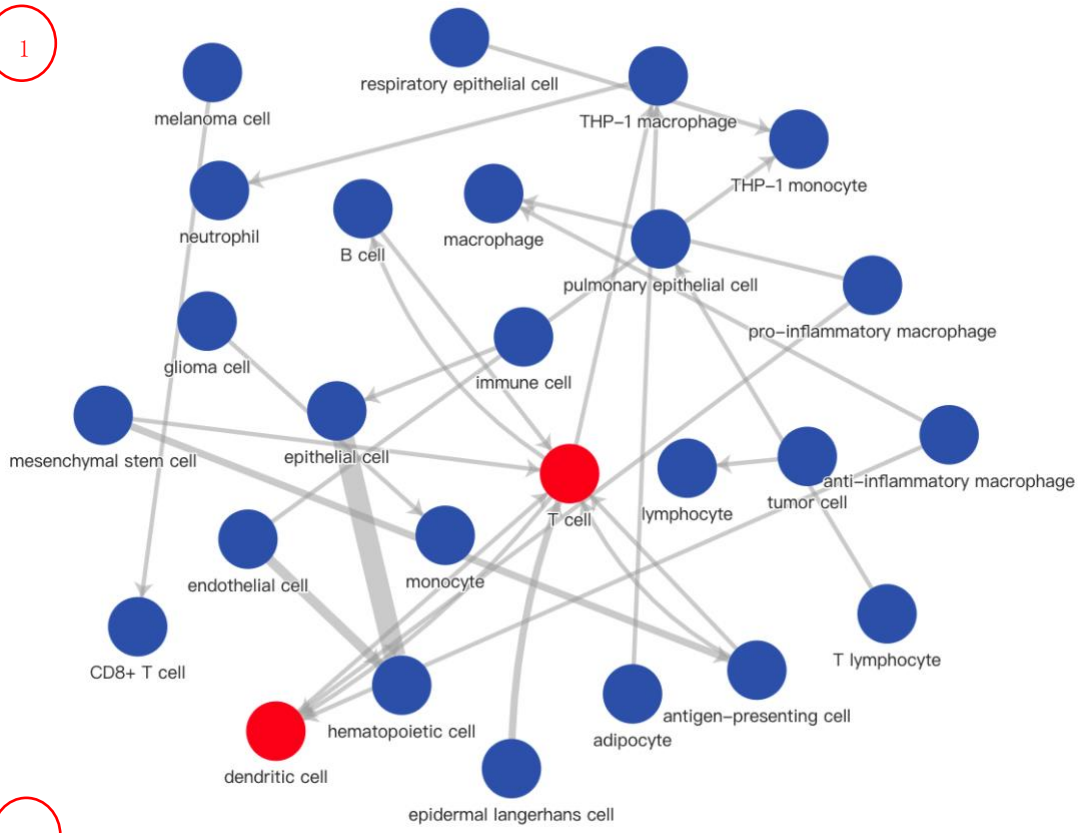


For example, a scientist wants to find out the cell-cell interactions related to immune response. By selecting the context “immune response” (1) in the “Search” page, they can obtain 37 interactions, with a graphical display and a table with detailed information. If the scientist would like to query about cell-cell interactions involving ‘epithelial cell’, they can select ‘epithelial cell’ from the root node in the hierarchical trees of cell types and check the option of ‘Show cell-cell interactions involving cell types of interest’ (8) after clicking on the ‘Reset’ button (5). A figure and table containing 79 interactions involving ‘epithelial cell’ are returned. Users can then choose the ‘Show cell-cell interactions at the class level’ box (7) to figure out which cell types interact with epithelial cell in different contexts from the figure at the class level. If the users are interested in epithelial cell interacting with T cell, they can also obtain epithelial cell interacting with T cell evident in other contexts by clicking on the ‘Reset’ button (5) and selecting the cell types ‘epithelial cell’ and ‘T cell’ from the hierarchical trees of cell types. The query results display epithelial cell interacting with T cell in all contexts.

2. Result help

The result by selecting the context “immune response” in the “Search” page contains a graph with cell types as nodes and cell-cell interactions as edges, of which the thickness indicates the number of evidence (1). Detailed information of cell-cell interactions shown in the graph is displayed in a table, including Publication year, Organism, MeSH term, Context, Phase, Tissue, Function, Source cell type class, Source cell type, Target cell type class, Target cell type, Clear direction, Reciprocal direction, Interaction details, Method, Method details, Reference, Information, Full PDF, PMID, and Title, which may be displayed in multiple pages (2). By clicking on the hyperlink in the MeSH term (3), it will navigate to its detailed information.

1



2

Result

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Mesh Term	Context	Phase	Tissue	Function	Source cell type class	Source cell type	Target cell type cl
mune System Phenomena (G1	immune response	NA	NA	elicit a more robu…	macrophage	pro-inflammatory macrophage	macrophage
mune System Phenomena (G1	immune response	NA	NA	elicit a more robu…	macrophage	pro-inflammatory macrophage	dendritic cell
mune System Phenomena (G1	immune response	NA	NA	enhanced the sec…	macrophage	anti-inflammatory macrophage	macrophage
mune System Phenomena (G1	immune response	NA	NA	enhanced the sec…	macrophage	anti-inflammatory macrophage	dendritic cell
mune System Phenomena (G1	immune response	NA	NA	secrete more pro-…	immune cell	immune cell	epithelial cell
mune System Phenomena (G1	immune response	NA	NA	permitting tumor …	others	melanoma cell	T cell
mune System Phenomena (G1	immune response	NA	NA	NA	B cell	B cell	T cell
mune System Phenomena (G1	immune response	NA	NA	T cell activation	dendritic cell	dendritic cell	T cell
mune System Phenomena (G1	immune response	NA	NA	suppress T-cell im…	tumor cell	glioma cell	monocyte

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