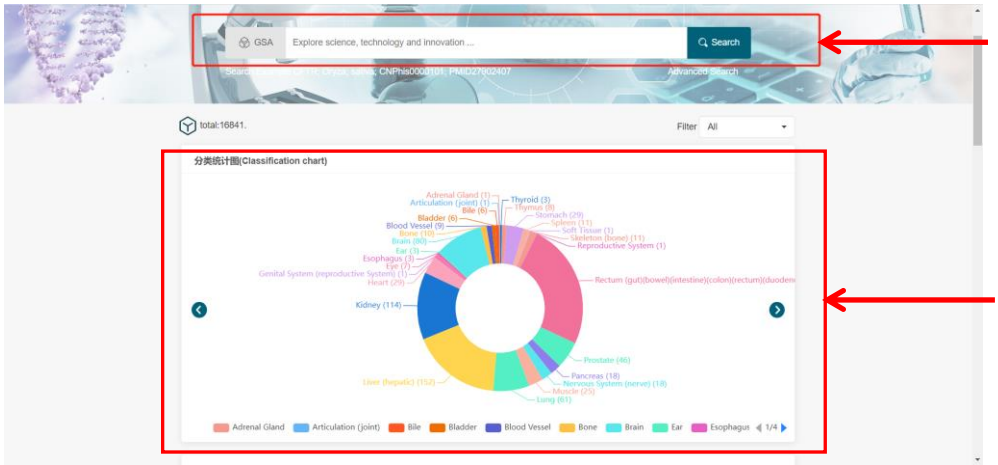
Help document

1. Popular resources

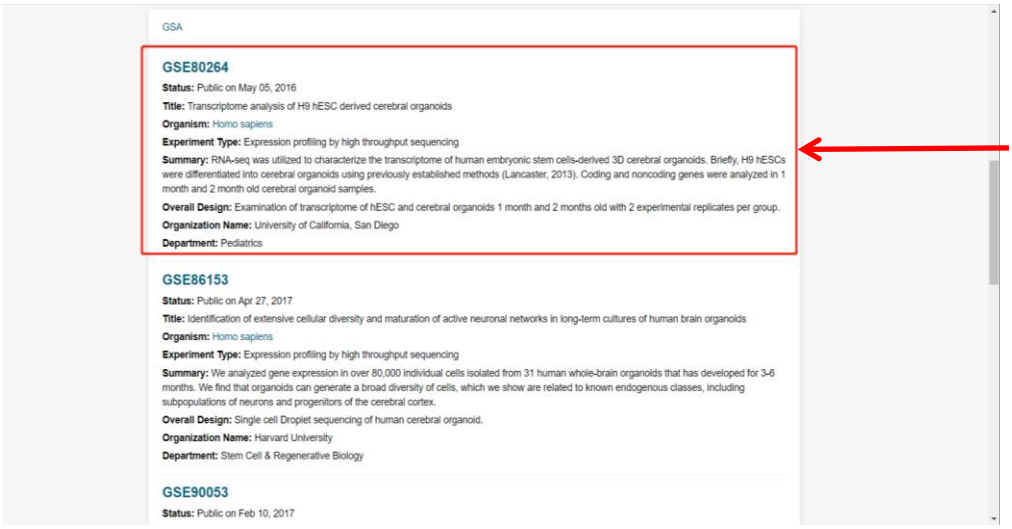
1.1. GSA Database

A total of 16,841 cases of microarray and transcriptome sequencing raw data were collected in the GSA database. These data are categorized on the basis of human organs and tissue types, including the lung, muscle, skeleton, nervous system, genetic system, soft tissue, etc. The exact number of microarray and transcriptomic sequencing can be found on the database website. In addition, publication years of organs-on-a-chip–related literature are tracked. Moreover, the statistical results showed that in recent years, the research data on organs-on-a-chip are increasing, and organs-on-a-chip is gradually becoming a trending research area.

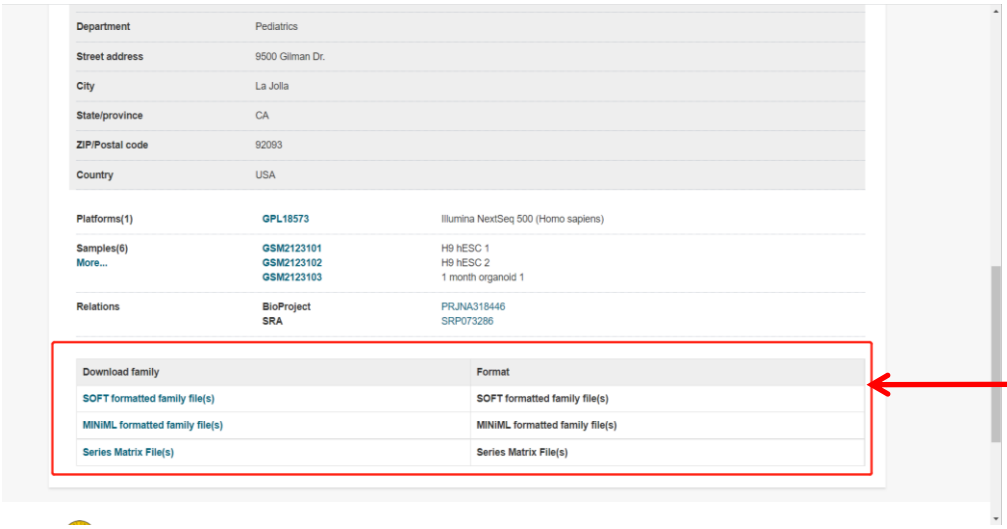


Click here to search for histological data

View the Classification chart here



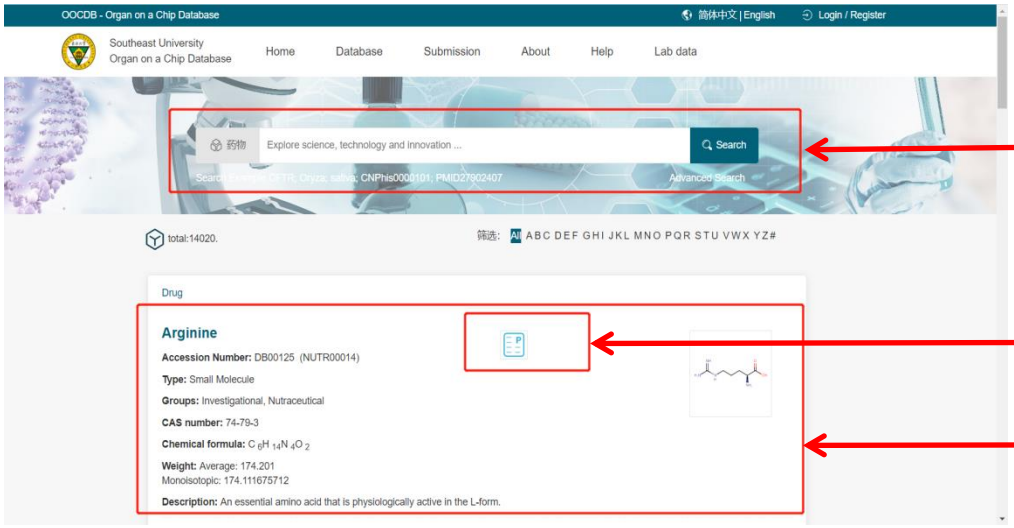
Click here to view the histological data



Click here to download the histological data

1.2. DrugBank Database

The DrugBank database contains information on 14,020 types of drugs associated with organs-on-a-chip. The database provides the drug information such as name, accession number, structure, chemical formula, synonyms, Unique Ingredient Identifier (UNII), International Chemical Identifier (InChi), InChi key, Simplified Molecular Input Line Entry System (SMILES), weight, drug entry, and other drug information which helps users to find drug-related information.



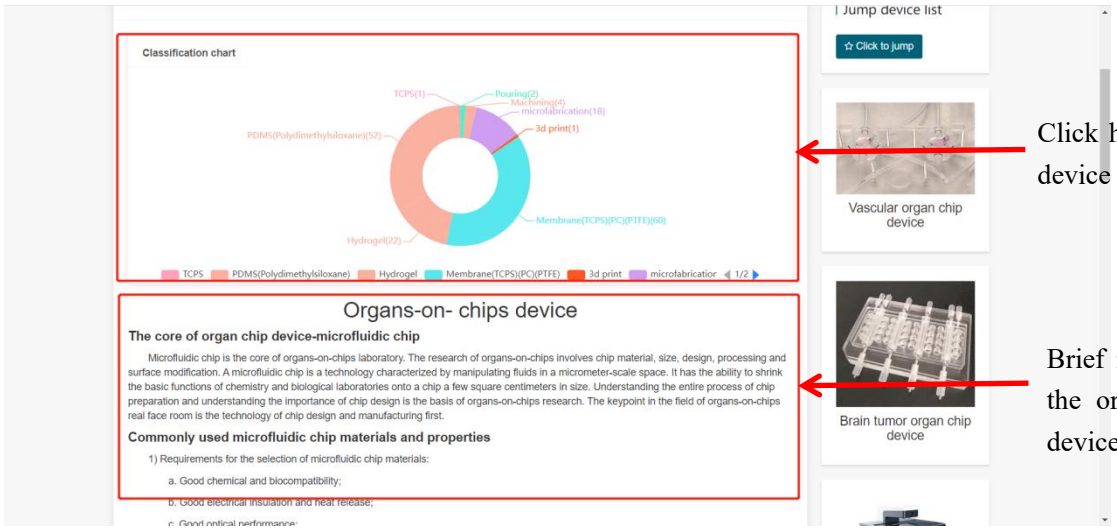
Click here to search for drug data

Click here to view the Drug-related literature

Click here to view the drug data

1.3. Device Database

In the device database, we first presented the distribution map of 160 studies on organs-on-a-chip devices. Users can click desired organs-on-a-chip devices in the distribution map to retrieve the relevant studies in the literature database. The database contains a brief introduction of organs-on-a-chip devices, including fabrication materials, production technology, fluid drive and control in microfluidic chip, and signal detection.



Click here to view the device data

Brief introduction of the organs-on-a-chip device

1.4. Organ Database

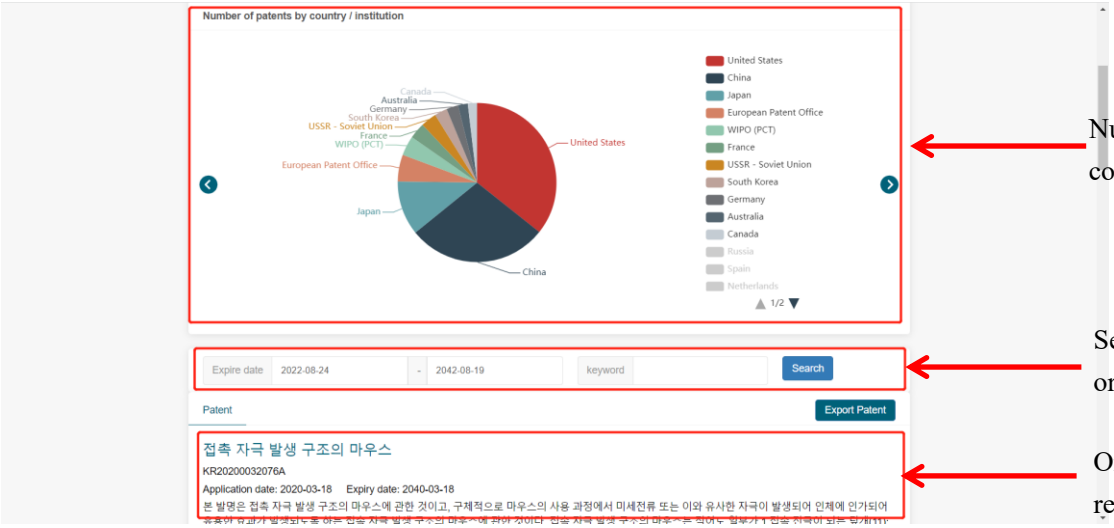
In the organs database, studies are classified on the basis of organ names, resulting in

97 different categories and each category corresponding to an organ. Comparing these category keywords with the organs-on-a-chip literature that we downloaded, a total of 77,628 relevant documents were screened and then classified. Subsequently, the top 20 organs were selected with the highest frequency for a graphic display. In the organ database, the most studies on organ microarray were about the brain (15,974), liver (11,844), and lung (5758), which is also the research hotspot of organ microarray. OOCDB provides full-text downloads of these related studies and maps of references and citations. The reference and citation are drawn into a citation map, and the size of the circle indicates the author's influence in this field. The larger circle indicates the greater influence of authors, which is convenient for researchers to find experts in the field.

1.5. Patent Database

The patent database is developed by screening out 54 keywords associated with organs-on-a-chip, searching on google patents, and retrieving a total of 11,915 patents. These patents are downloaded to our database and classified according to different countries. In addition, OOCDB provides full-text retrieval and allows downloading of relevant patents. Users can narrow the search scope according to date and country in the OOCDB and also retrieve in the advanced search according to title, author, abstracts, description, patent number, and country expiry date of the patent. Therefore, the users

can easily download the patents they need.



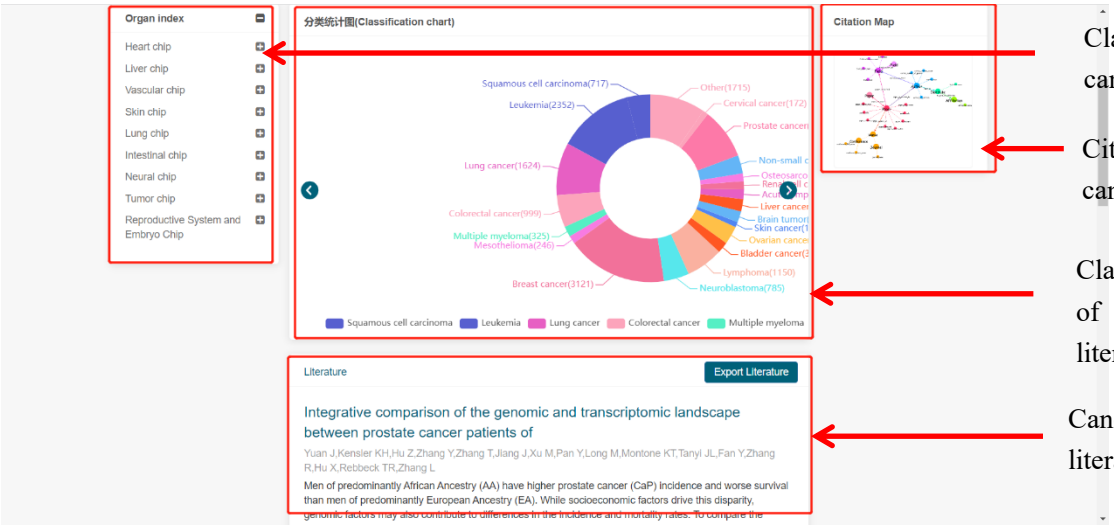
Number of patents country / institution

Search for patents by ti or keyword

Organs-on-a-chip related patent

1.6. Cancer Research Database

The cancer research database is similar to the organs database. Using 87 cancer keywords, 30,158 articles were found, and the top 20 cancers frequently mentioned in papers were presented in a chart. In the cancer database, breast cancer (3189), leukemia (2386), and lung cancer (1701) are mentioned in high frequency, and organs-on-a-chip are widely used in these cancers. Similar to the organs database, this database also contains a citation map to find out the authoritative scholars in the field of organs-on-a-chip and cancer.



Classification of cancer

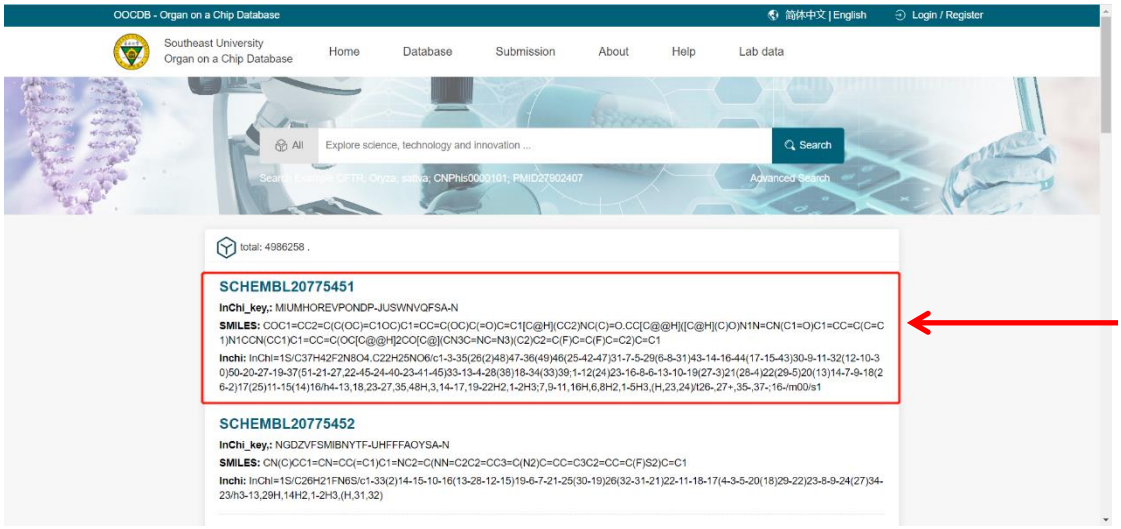
Citation map of the cancer literatures

Classification chart of the cancer literatures

Cancer related literature

1.7. Chemical Database

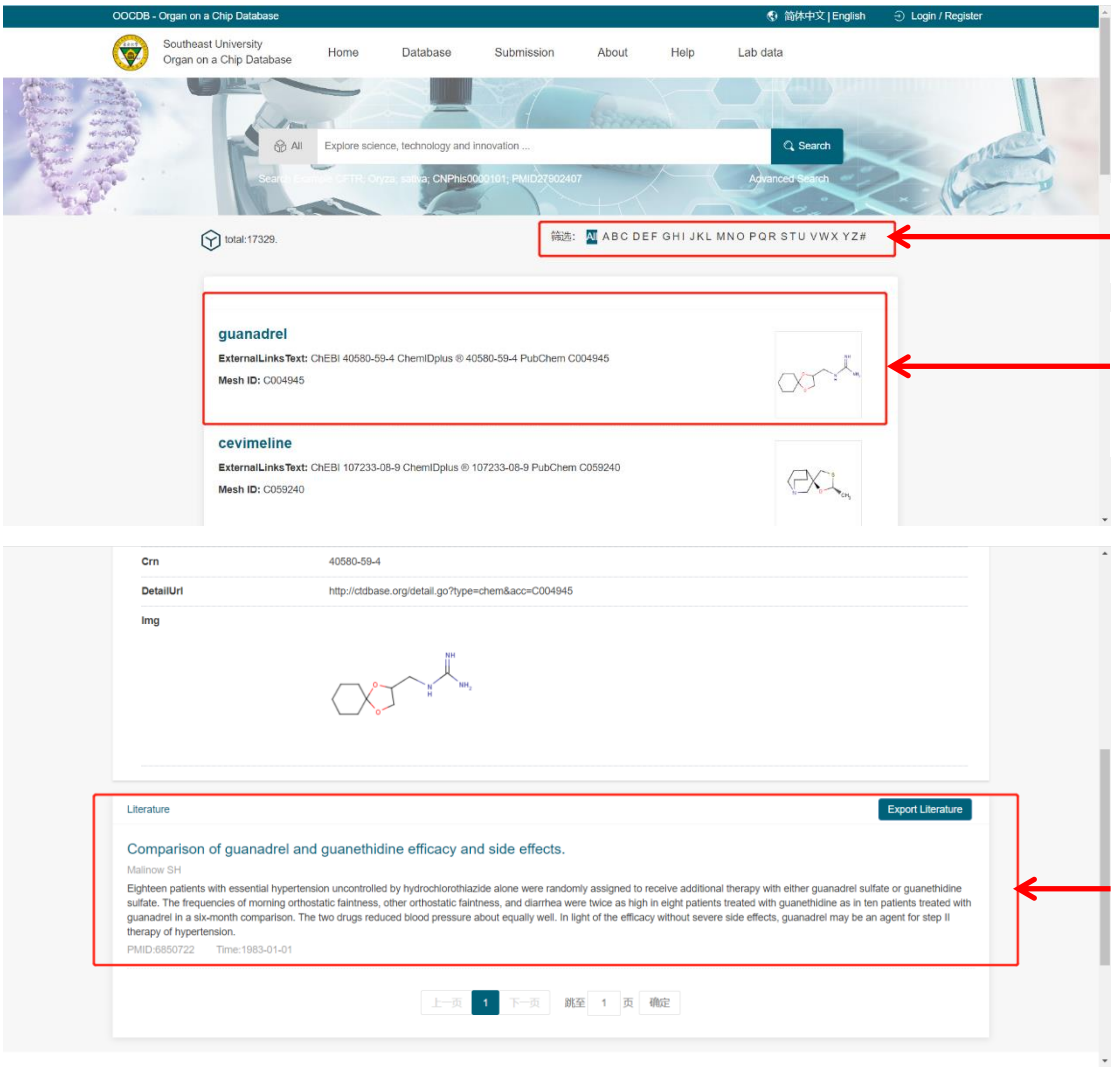
The chemicals database stores the information of 4,986,258 compounds associated with organ microarrays. The compounds are ordered by name. The compounds database provided information, including InChi key, SMILES, and InChi. It is convenient for users to find the structures and properties of related compounds.



Chemical-related data

1.8. Toxicant Database

The toxicants database contains information about 17,329 types of toxicants. They are arranged in alphabetical order and can be retrieved according to the order of the alphabet. Moreover, users can directly import the name of the toxicants in the search box and jump to the toxicants interface. In the toxicants detailed interface, information on various toxicants, including name, equivalent terms, other database numbers, CAS registry number, structure image, and external links, is provided. If some properties of toxicants cannot be found in OOCDB, users can also click on external links to enter the special toxicants database for a query. At the same time, we also combined the toxicants database with the organs-on-a-chip literature database. If the toxicant is applied to organs-on-a-chip–related research, the corresponding literature is provided below.



Toxicants data screening

Click to see details of the toxicants

Toxicants related literatures

2. Featured tools

2.1. Three-dimensional model

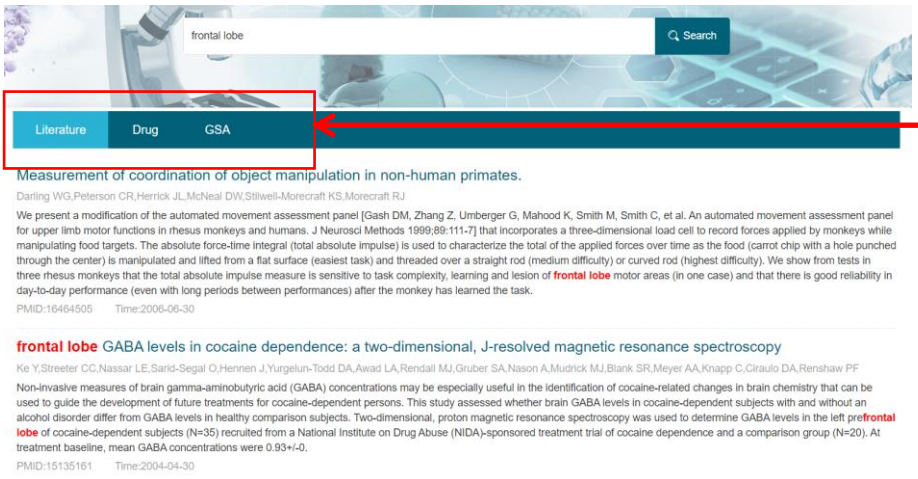
A 3D model is a tool used to understand the combination of organs-on-a-chip data in OOCDB and human organs at the level of human anatomy. Users can navigate and find the target organ by navigating in 3D anatomical atlas for the human brain male and female bodies. A visual window shows the real human anatomical structures. This includes three parts: human brain model, male anatomical model, and female anatomical model. Figure shows that the database provides high-quality human brain model, male anatomical model, and female anatomical model, including internal structures using a surgical view. Users can click the image to enter the corresponding

model and then click it to enter the corresponding organs. On clicking the corresponding position of the organ in the model, users can get the corresponding organ name, and then by clicking the name of the organ, users can view omics data, literature data, and drug data of the organ in OOCDB to find the detailed information on the organs-on-a-chip and the current research status.

Click here to select a 3D model

Click here to search for related organs

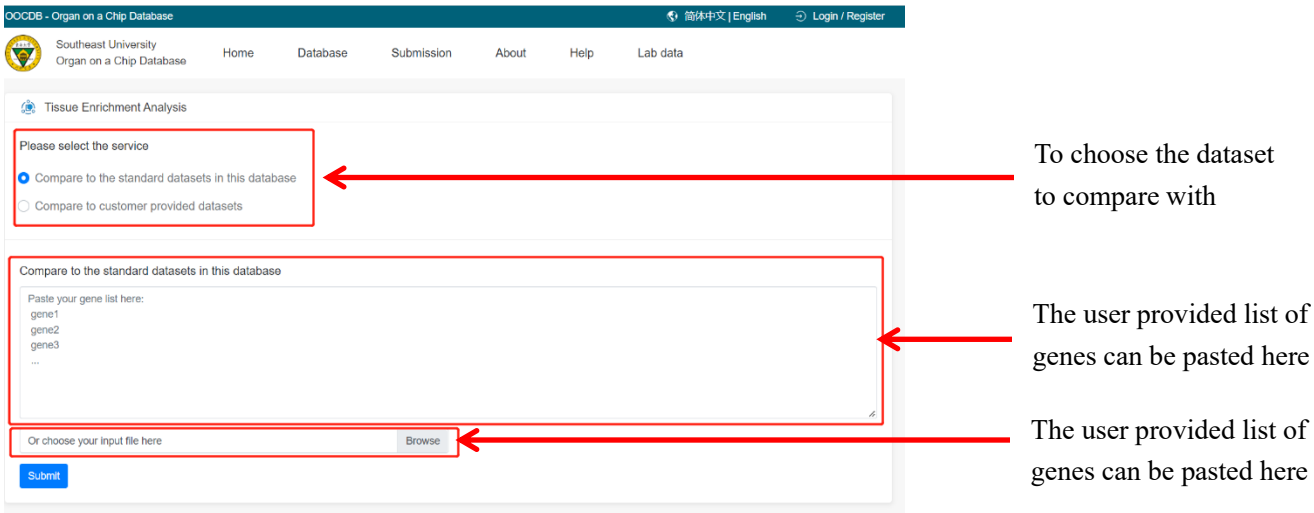
Click here to search for organs

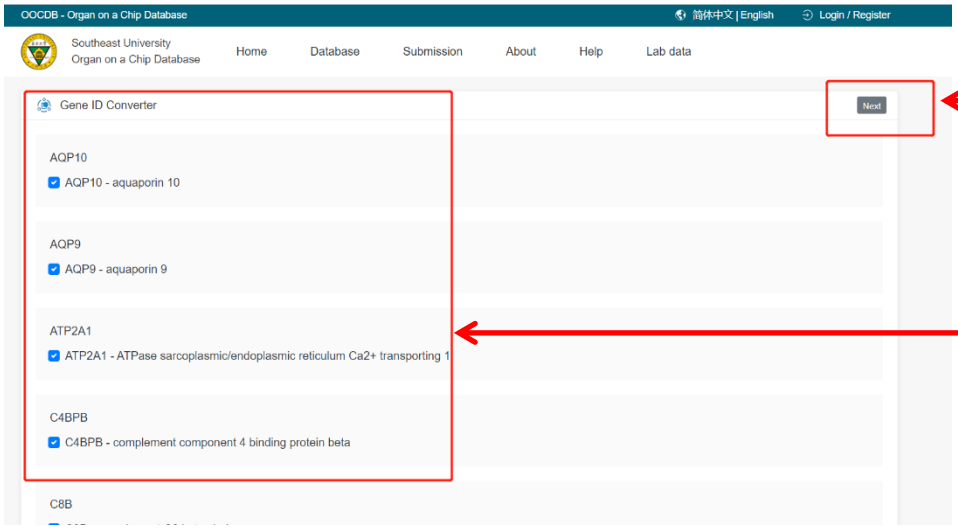


Click here to switch search results

2.2. Mathematical Model

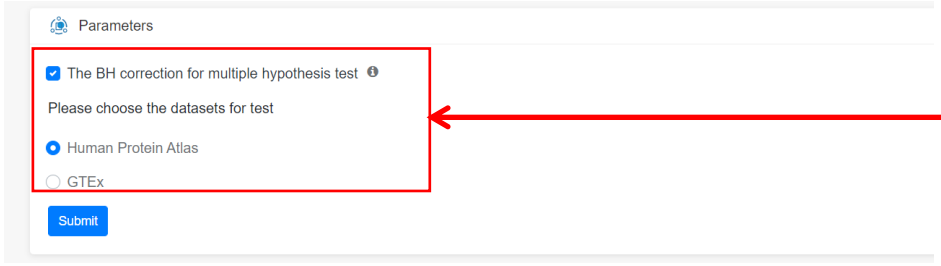
we provided a mathematical modeling section that provides users with a useful tool to estimate consistency between in vitro data based on their organs-on-a-chip platform and the gene expression data from real human organs. This section currently provides a tissue-specific enrichment approach named TissueEnrich, a tool to calculate the enrichment of tissue-specific genes in a set of input genes with the hypergeometric test. For the input step, user uploads the gene list of the most highly expressed genes, differentially expressed genes, or co-expressed genes to the web server. The gene list can be typed directly or selected as a file in the web page of the tool. In addition, the user can provide an expression dataset of interest for further tissue-specific enrichment analysis in the next step. The results will be tables and plots. The tables are the scores of the enrichment analysis, such as the log10(P-value), tissue-specific gene number, fold change, samples, and tissue type, and the genes that are enriched. The plots are the bar plot of the log10(P-value)and the heat map of the expression profile of the tissue-specific genes.



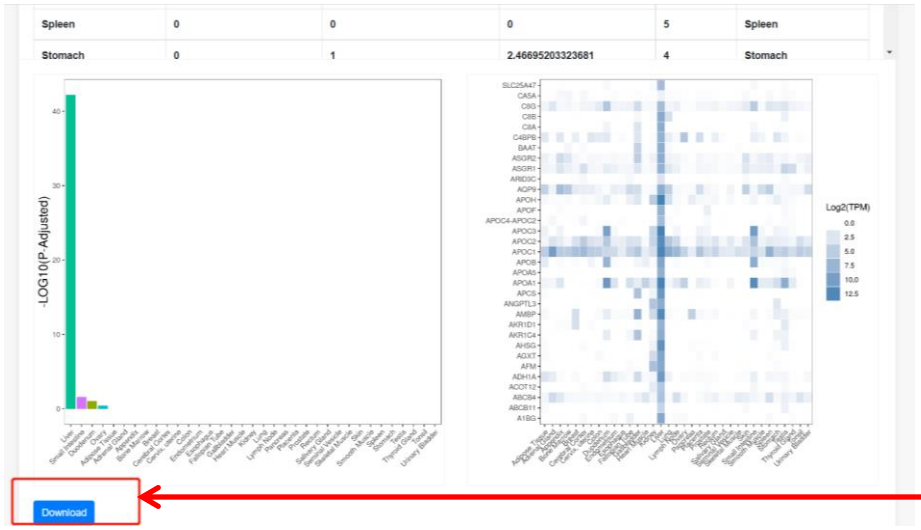


Go to the next step of analysis

Select the gene to be analyzed



Select whether to perform BH correction and the database for comparison

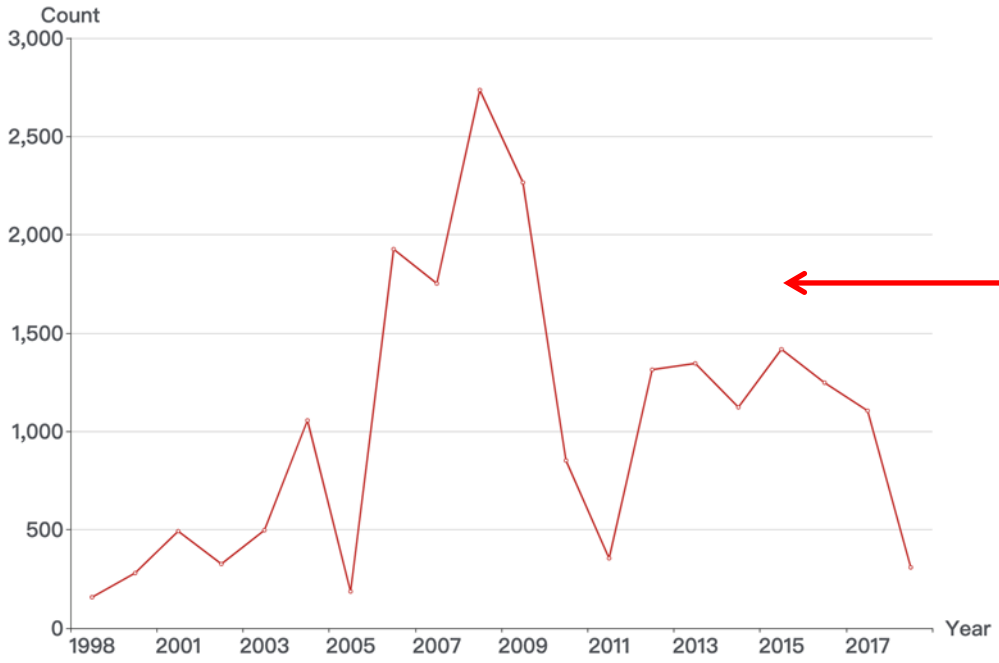


Download Analysis Results

2.3. Citation Map

The citation map is a tool used in OOCDB to analyze the citation situation in organ chips. Users can search for a field keyword in the search box of citation map. Citation map will search for authors in the organs-on-a-chip literature database based on the keywords searched by users and visually present them. In addition, users can click on all data to visualize the entire data. Figure shows that the size of the circle indicates the

number of papers cited by that author in the field, and the larger the circle, the more cited articles the author has in the field. In addition, the citation relationship, if any, of each author in the field is expressed in the citation map by connecting the lines. Moreover, a trend graph of publications in the field is given in Figure, showing the change in the number of studies cited on organs-on-a-chip over time.



3. Lab data

The organs-on-a-chip model supports search, filter, and download functions. Users can search directly for relevant organs-on-a-chip data or filter data by organ and/or simulation method to find the data they expected quickly and easily. Meanwhile, we provided the download function, allowing users to directly download the data they required. In addition, users can view detailed organs-on-a-chip data by clicking on "Detail," which provides detailed information for each organs-on-a-chip.