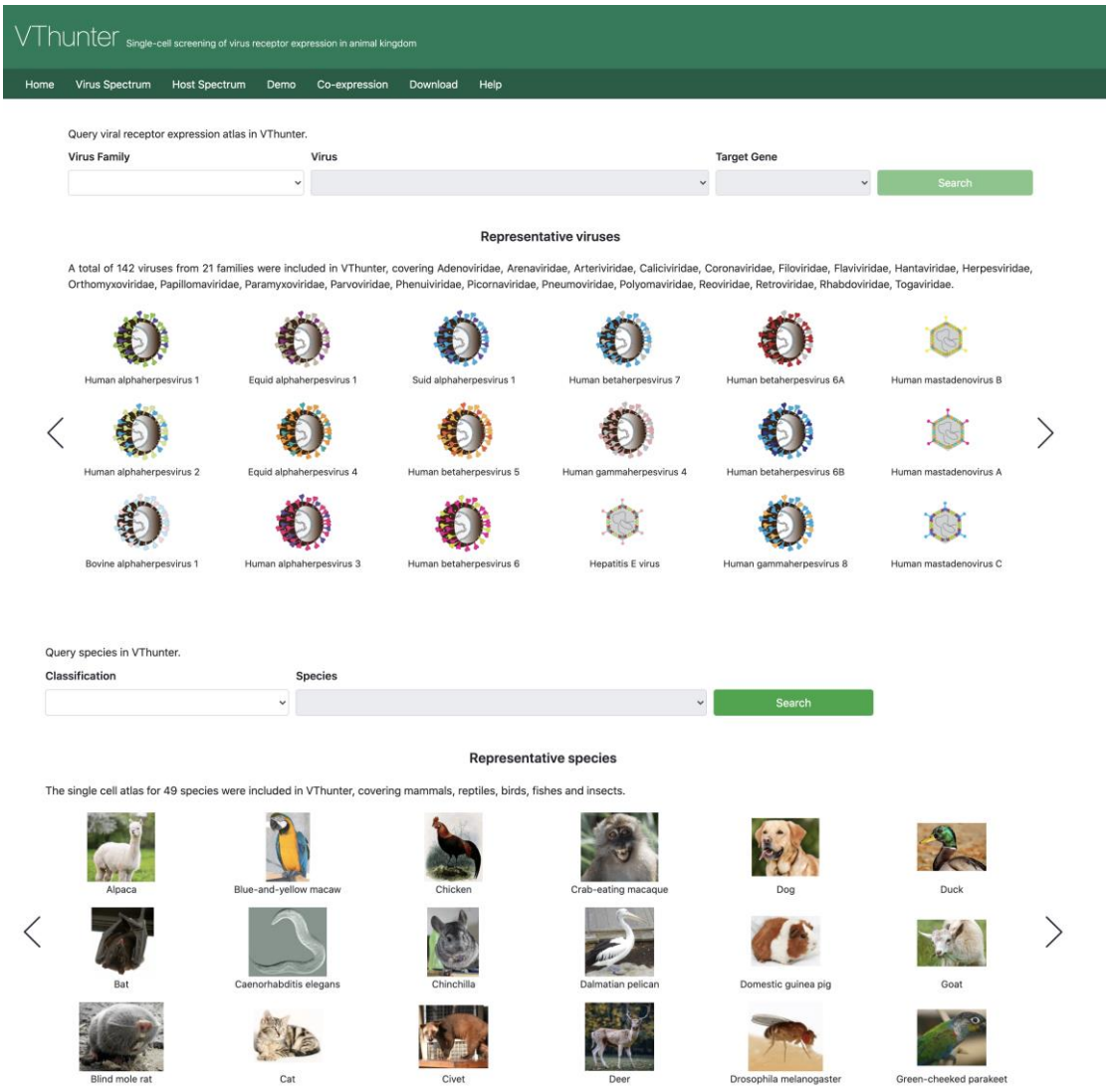
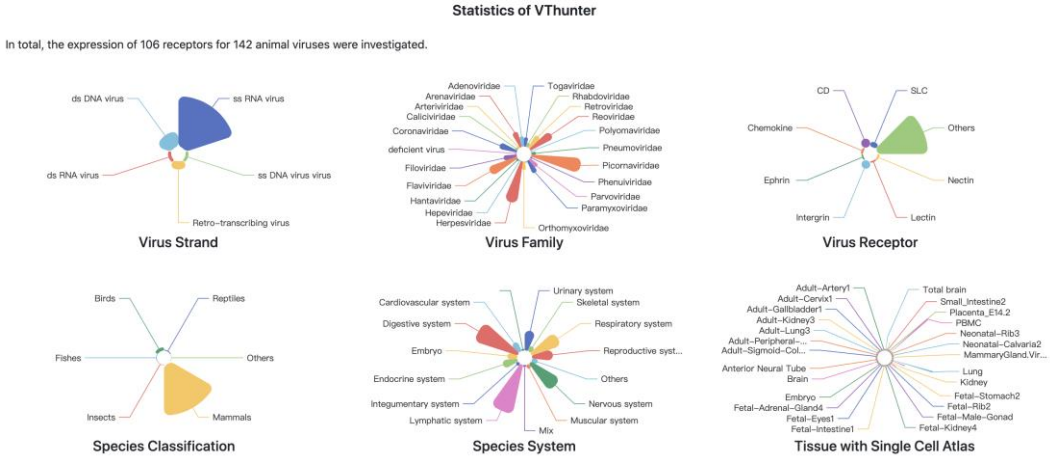
Home Help

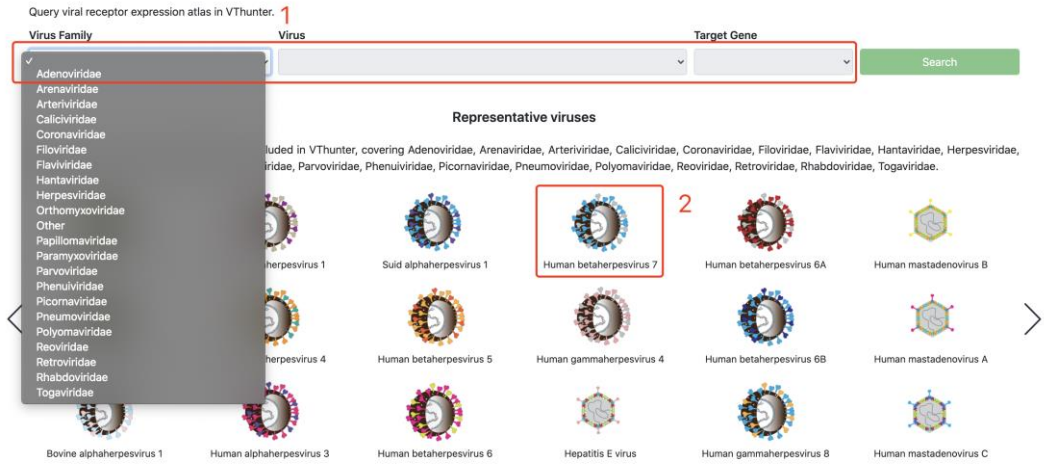
The home page provides a top-down view of representative viruses, representative species, and statistics of VThunter.

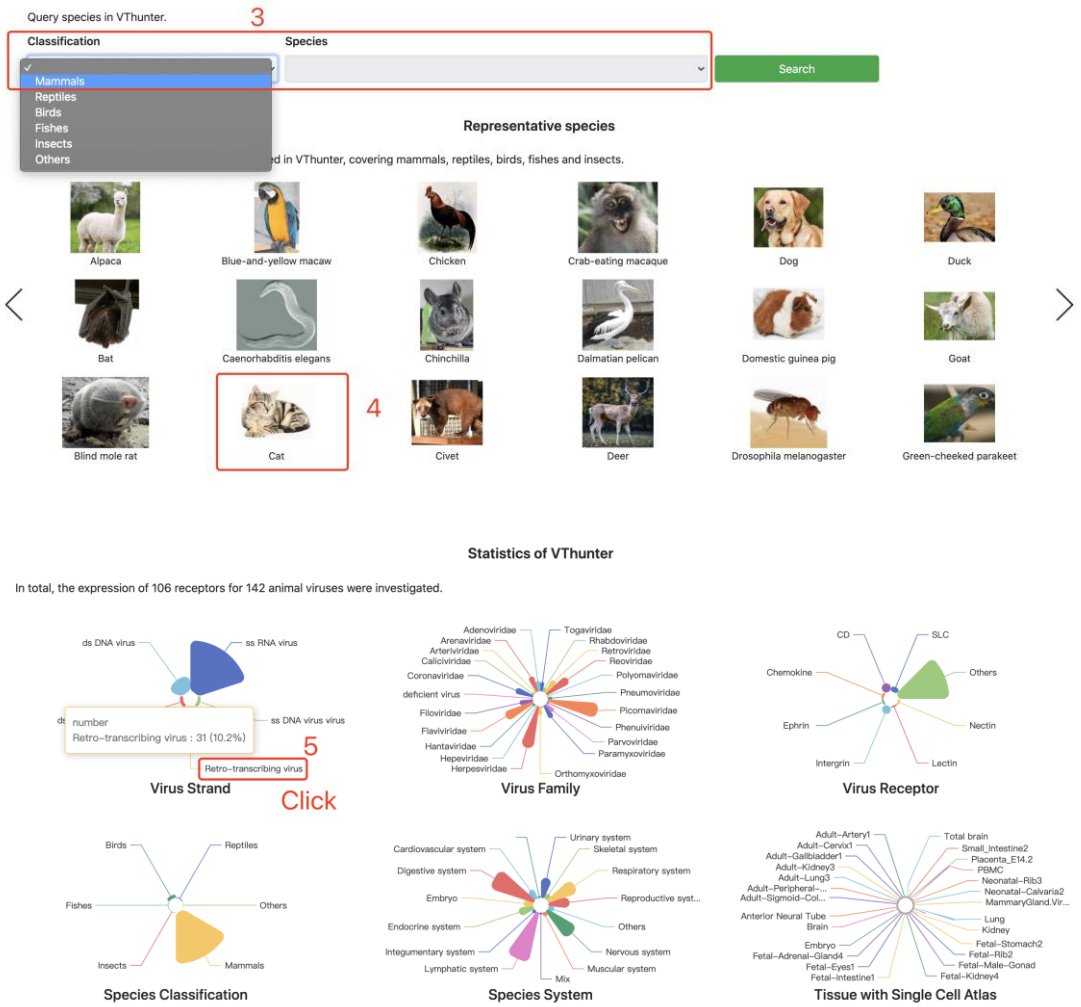




Users can query virus receptor expression atlas through the known family of viruses (1) and query host receptor expression atlas through their classification (3). Users can also click on the graphs of representative viruses (2) or species (4) to go to the virus receptor expression atlas pages or host receptor expression atlas pages.

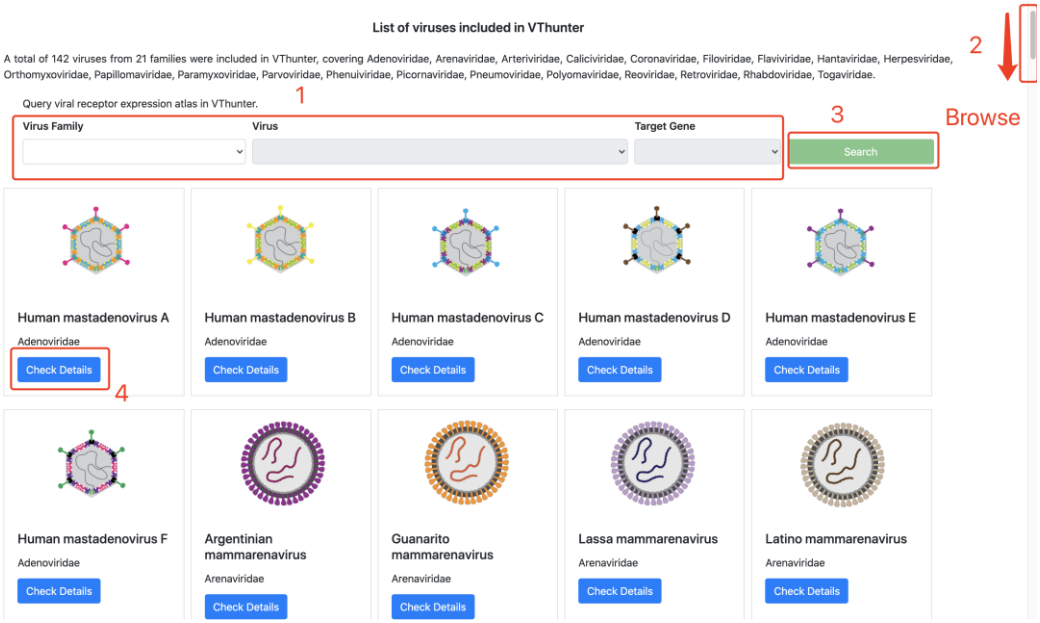
Besides, users can click on the statistics of VThunter (5) to jump to the pages containing the corresponding types of virus strands, virus families, virus receptors, species classifications, species systems, or tissue with single cell atlas.





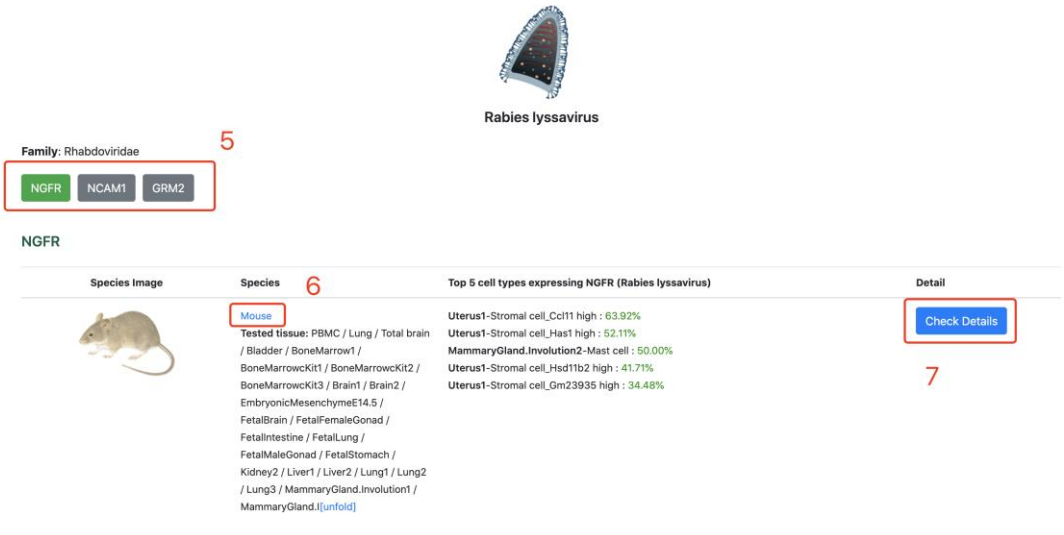
Virus Spectrum Help

The virus spectrum page provides a list of viruses included in VThunter, covering families such as Adenoviridae, Arenaviridae, Arteriviridae, Caliciviridae, Coronaviridae, Filoviridae, Flaviviridae, Hantaviridae, Herpesviridae, Orthomyxoviridae, Papillomaviridae, Paramyxoviridae, Parvoviridae, Phenuiviridae, Picornaviridae, Pneumoviridae, Polyomaviridae, Reoviridae, Retroviridae, and Rhabdoviridae Togaviridae. Users can query a virus or receptor by selecting the family of virus (1) or browse through a list of viruses (2). The Search button (3) leads to the receptor expression atlas pages. The “Check Details” button (4) below the graph and family of virus can jump to a page displaying expression atlas of all the receptors of this virus.



Virus receptor expression atlas pages help

The virus receptor expression atlas page contains a list of all species and top 5 cell types which express this receptor in our datasets. Users can click the buttons (5) to change the displayed viral receptors. Clicking on the species (6) leads to a host receptor expression atlas page. The “Check Details” buttons (7) in of each species brings the user to a result page.



Results pages help

The results page shows the expression of one viral receptor in one animal host species.
Detailed introductions of hosts (1) and receptors (2) are included first. Users can click on the species

and virus name to jump to the host receptor expression atlas pages and virus receptor expression atlas pages, respectively. The “NCBI” (3) and “Proteinatlas” (4) buttons lead to a description of the receptor in NCBI and the receptor’s bulk expression level in Humans in The Human Protein Atlas websites, respectively.

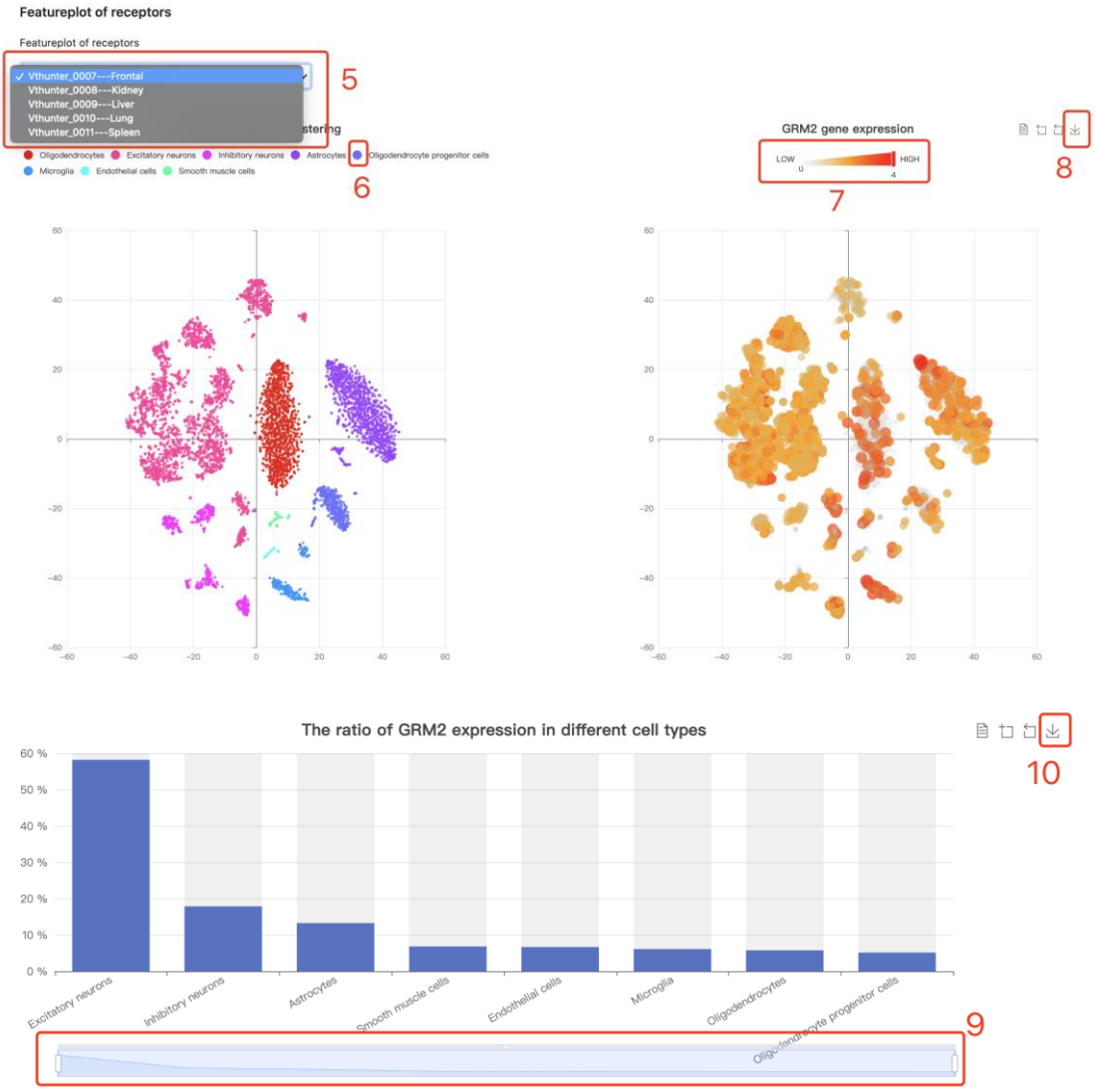
A “Data Source” presents the information all datasets of this species in VThunter. Each dataset contains only one tissue.

Data Source

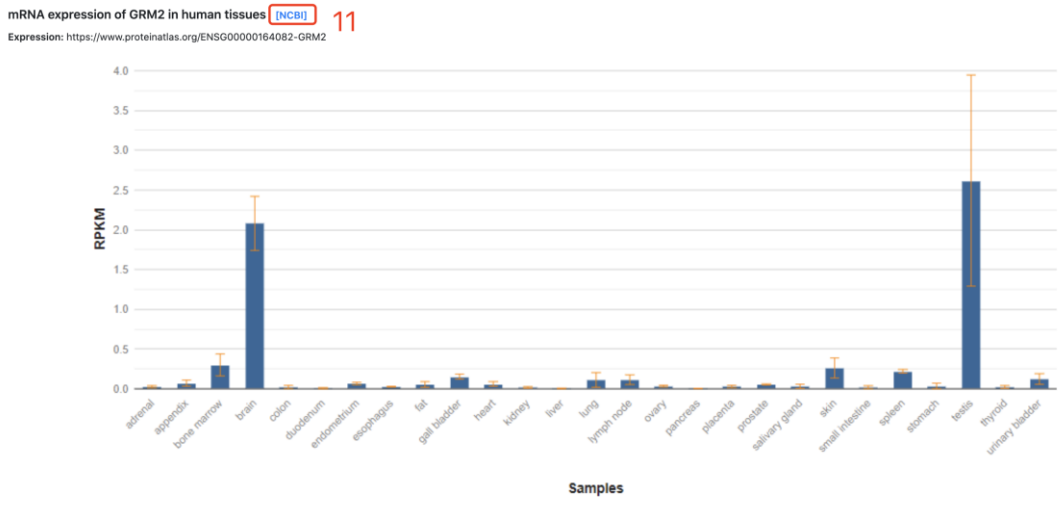
Data set information

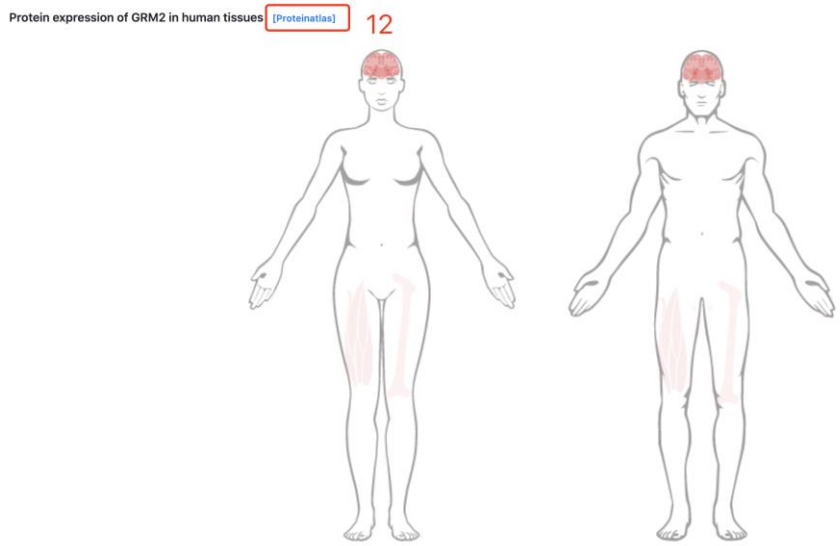
Project	Date	Technology	Tissue	Condition	Cell
Vthunter_0007	2021.04	10X Genomics	Frontal	Normal	6593
Vthunter_0008	2021.04	10X Genomics	Kidney	Normal	1930
Vthunter_0009	2021.04	10X Genomics	Liver	Normal	34029
Vthunter_0010	2021.04	10X Genomics	Lung	Normal	12863
Vthunter_0011	2021.04	10X Genomics	Spleen	Normal	9682

“Featureplots of receptors” uses tSNE plots to display the cell types of each tissue in the species and the expression of the receptor. Browsing through “Vthunter_xxxx----xxxx” options (5) from the dropdown menu displays information of various tissues. Selecting a cell type on the left alters the graph to show the cell types of interest (6). The bar of expression on the right changes the thresholds of the expression value (7). “The ratio of xxx (receptor gene name) expression in different cell type” shows the expression ratio of the receptor in the chosen tissue in a descending order. Users can drag the bar to choose cell types (9). Hovering above or clicksing on the dots of the tSNE plots reveals its tSNE coordinates. The download button can be used to download the expression information in a table format (8, 10).



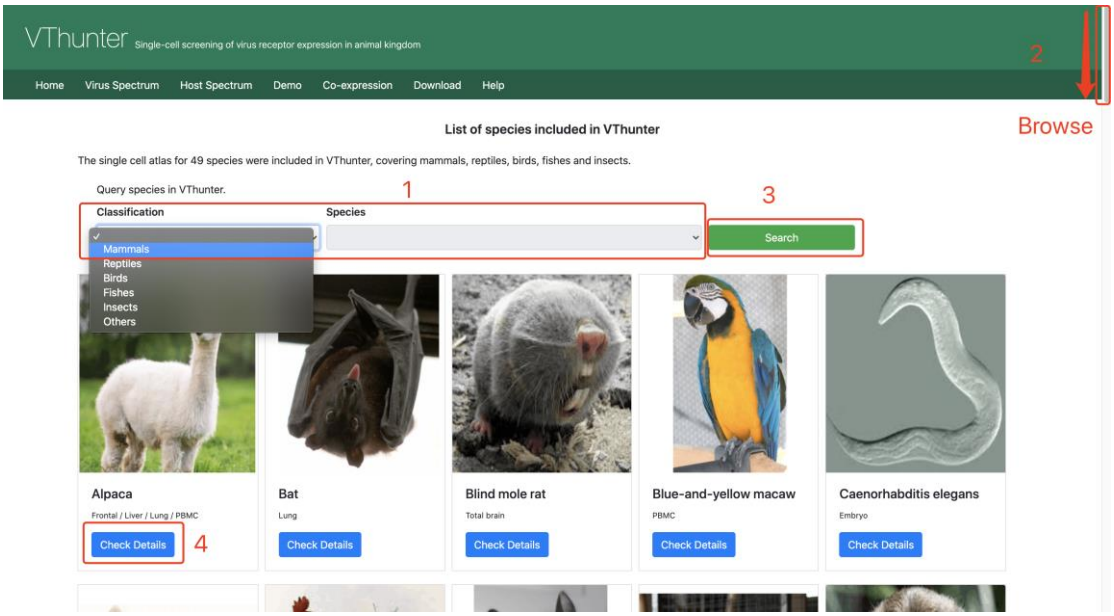
"mRNA expression of xxx in human tissues" and "Protein expression of xxx in human tissues" shows the expression of the receptor on a bulk mRNA level in NCBI and protein level in The Human Protein Atlas. The blue word are hyperlinked to the corresponding websites (11, 12).





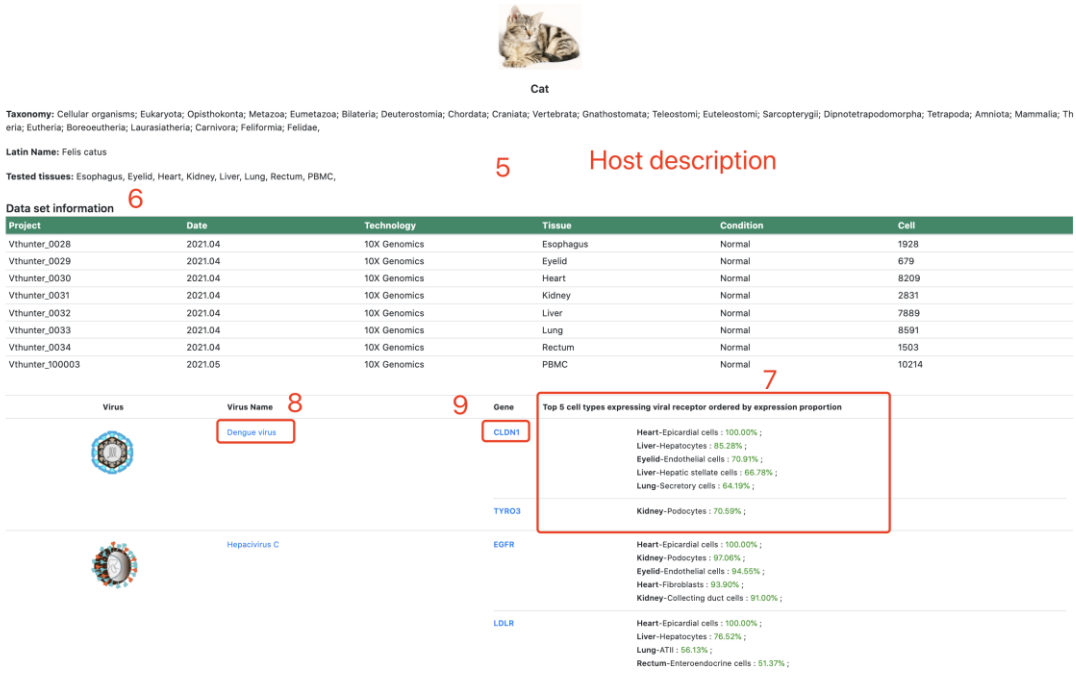
Host Spectrum Help

The host spectrum page provides a list of species of single cell atlas included in VThunter, covering mammals, reptiles, birds, fishes and insects. Users can query a species by the classification (1) or by browse through the list of hosts (2). The Search button (3) and “Check Details” button below the host species and tested tissues of hosts (4) links to the page that consists of the expression atlas of all the receptors in the species.



Host receptor expression atlas pages help

The host receptor expression atlas page contains a description of the host species(5), all tissues tested in VThunter (6), and a list of all virus and receptor genes expressed in the host species. For each receptor, the top 5 cell types expressing viral receptor are ordered by expression proportion and presented on the host receptor expression atlas page (7). Users can click on the virus names (8) to go to virus receptor expression atlas pages or click on the receptor gene (9) to go to the results pages.



Results pages help

The results page shows the expression of one viral receptor in one animal host species.
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Data Source

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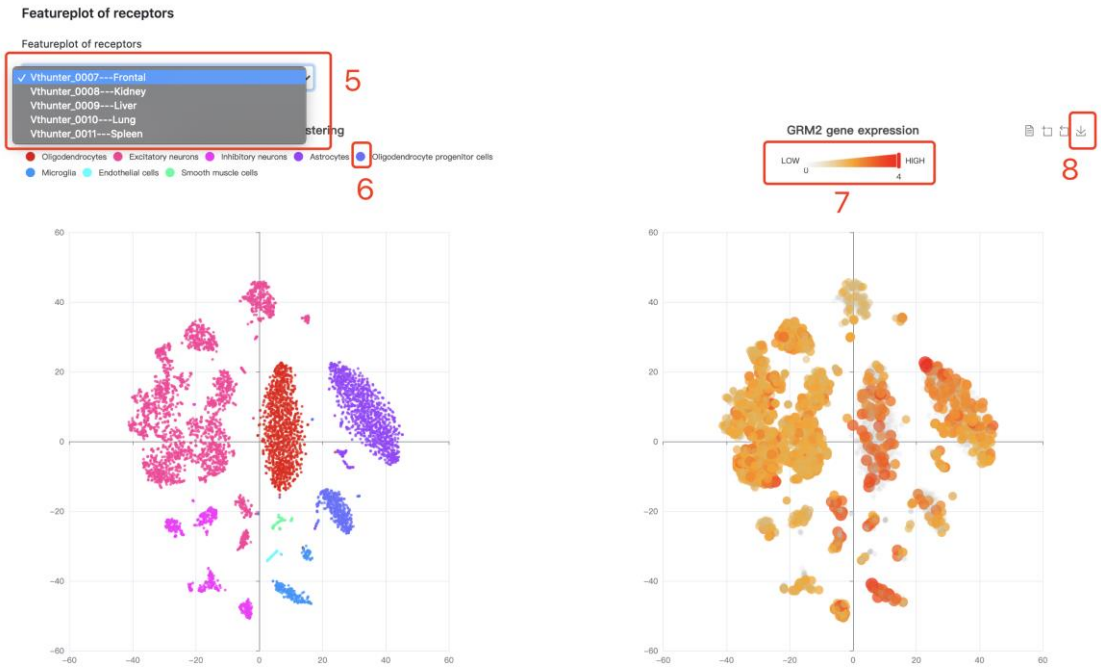

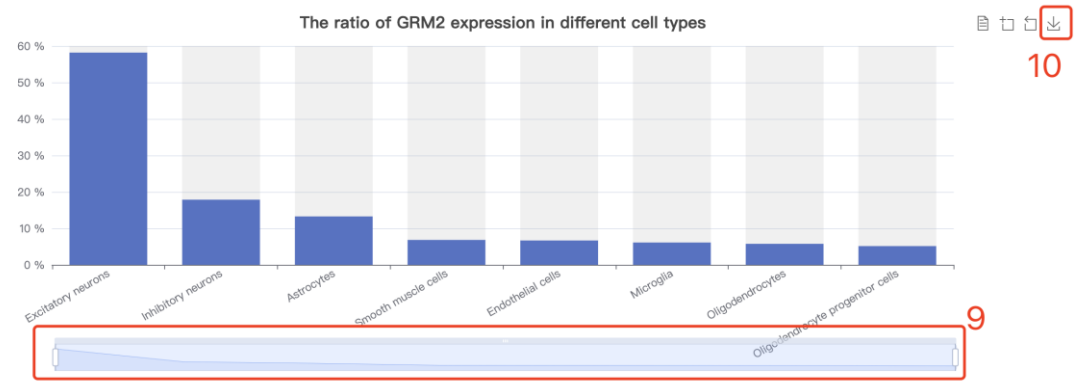

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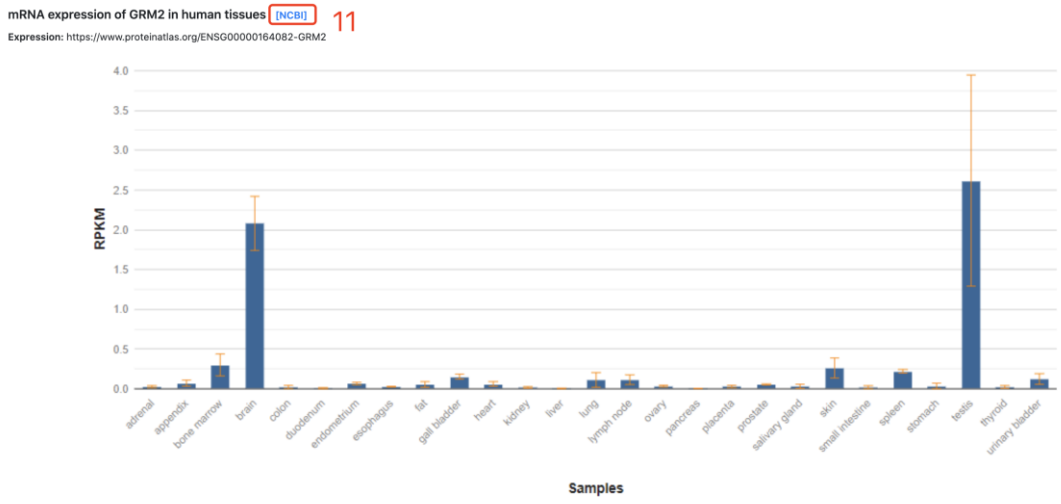
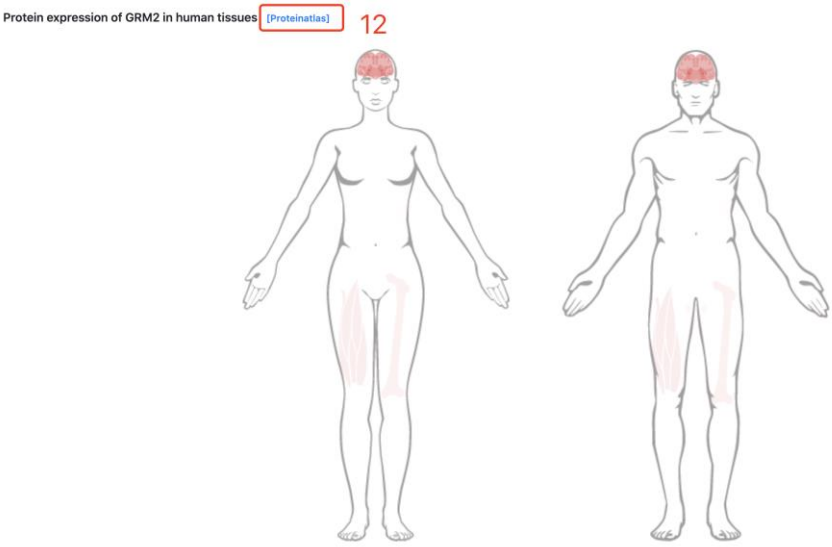




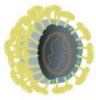
Demo Help

The Demo page shows an example of a results page of the expression of the *TYRO3* receptor of the Zika virus in the Dorsolateral prefrontal cortex of Rhesus monkeys.

Rhesus monkey

Scientific Name: Macaca mulatta

Taxonomy: Cellular organisms-> Eukaryota-> Opisthokonta-> Metazoa-> Eumetazoa-> Bilateria-> Deuterostomia-> Chordata-> Craniata-> Vertebrata-> Gnathostomata-> Teleostomi-> Euteleostomi-> Sarcopterygii-> Dipnotetrapodomorpha-> Tetrapoda-> Amniota-> Mammalia-> Theria-> Eutheria-> Boreoeutheria-> Euarchontoglires-> Primates-> Haplorrhini-> Simiiformes-> Catarrhini-> Cercopithecoidea-> Cercopithecidae-> Cercopithecinae-> Macaca



Zika virus

Family: Flaviviridae

Receptor: TYRO3

Receptor TYRO3 information

Summary: The gene is part of a 3-member transmembrane receptor kinase receptor family with a processed pseudogene distal on chromosome 15. The encoded protein is activated by the products of the growth arrest-specific gene 6 and protein S genes and is involved in controlling cell survival and proliferation, spermatogenesis, immunoregulation and phagocytosis. The encoded protein has also been identified as a cell entry factor for Ebola and Marburg viruses. [provided by RefSeq, May 2010] [NCBI] [Proteinatlas]

Data Source

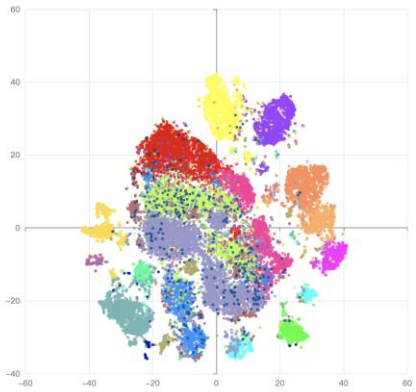
Data set information

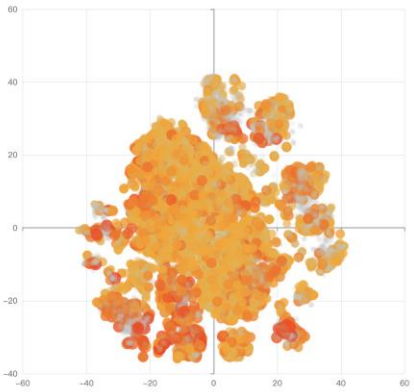
Project	Date	Technology	Tissue	Condition	Cell
Vthunter_110092	2018.12	10X Genomics	Dorsolateral prefrontal cortex	Normal	26933

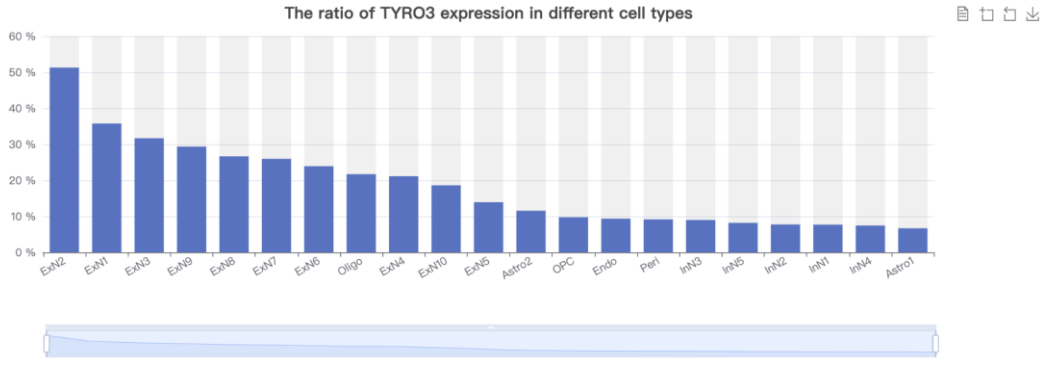
Featureplot of receptors

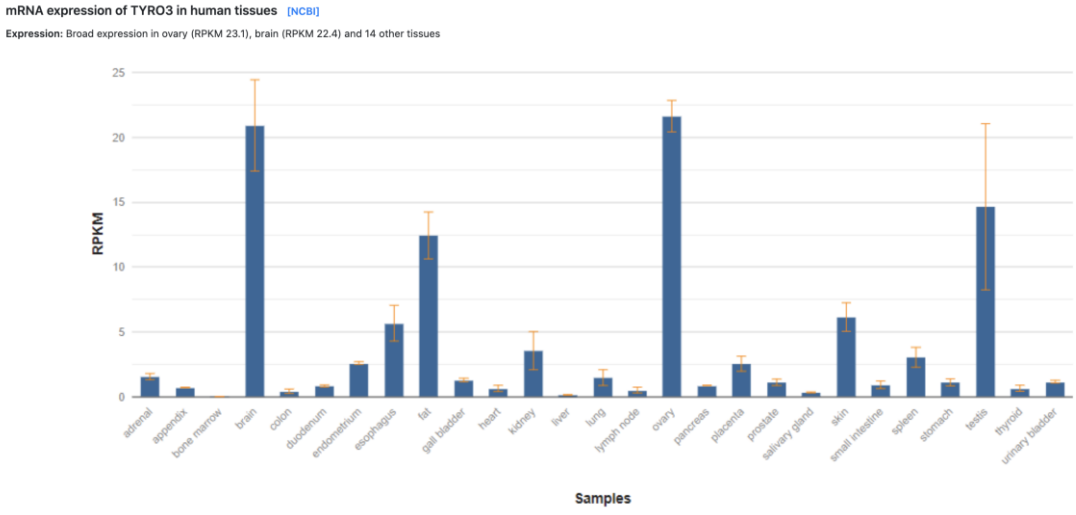
Featureplot of receptors

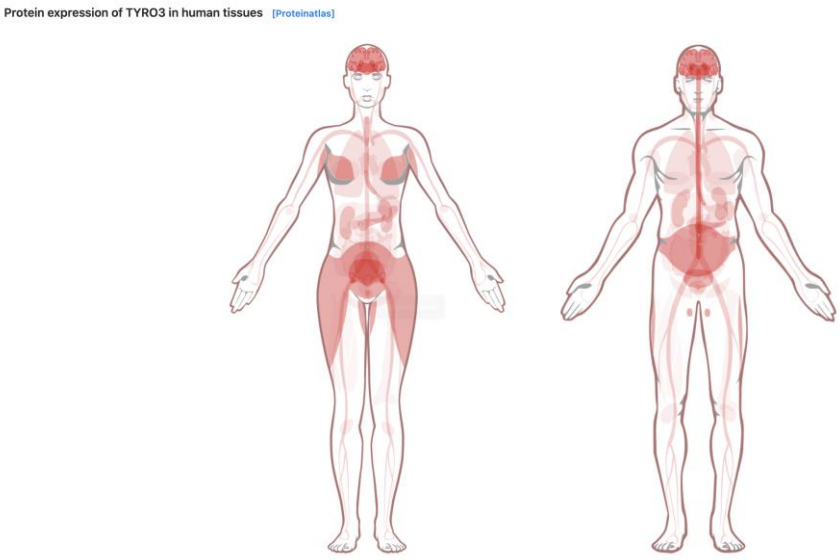
Vthunter_110092---Dorsolateral prefrontal cortex





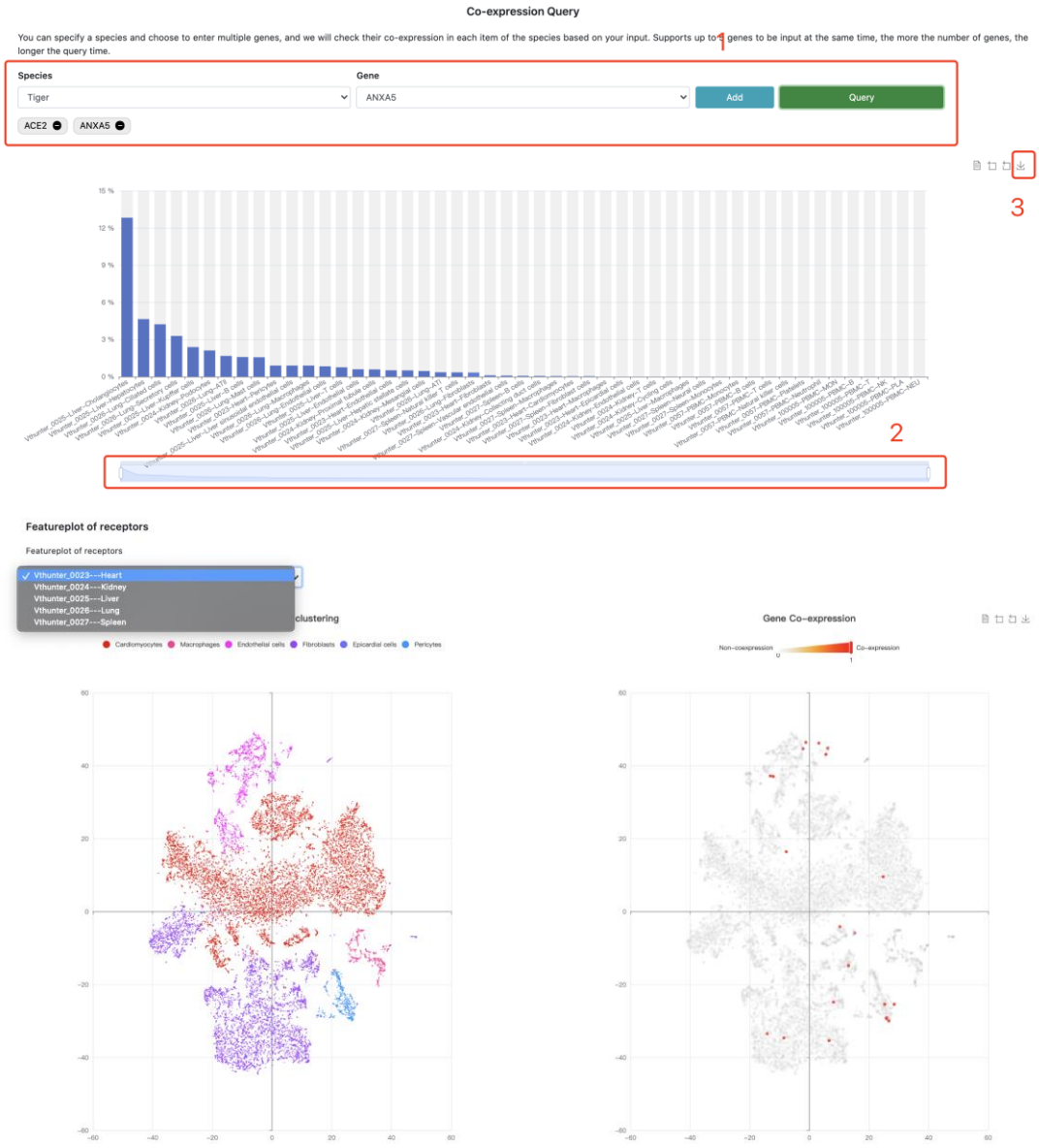






Co-expression Help

Users can specify a species and enter multiple genes to query the co-expression ratio of chosen genes in the selected species (1). Results are presented using an interactive boxplot and that can be changed to display different cell types by dragging the bar below (2). Co-expression results can be downloaded through a download button (3).



Download Help

Users can browse datasets by species and tissues and download the expression matrices and metadata using the download buttons on the top right of the plots.

Contact

Should you have any questions or comments regarding VThunter, please do not hesitate to contact us by emailing Dongsheng Chen (chendongsheng@genomics.cn).