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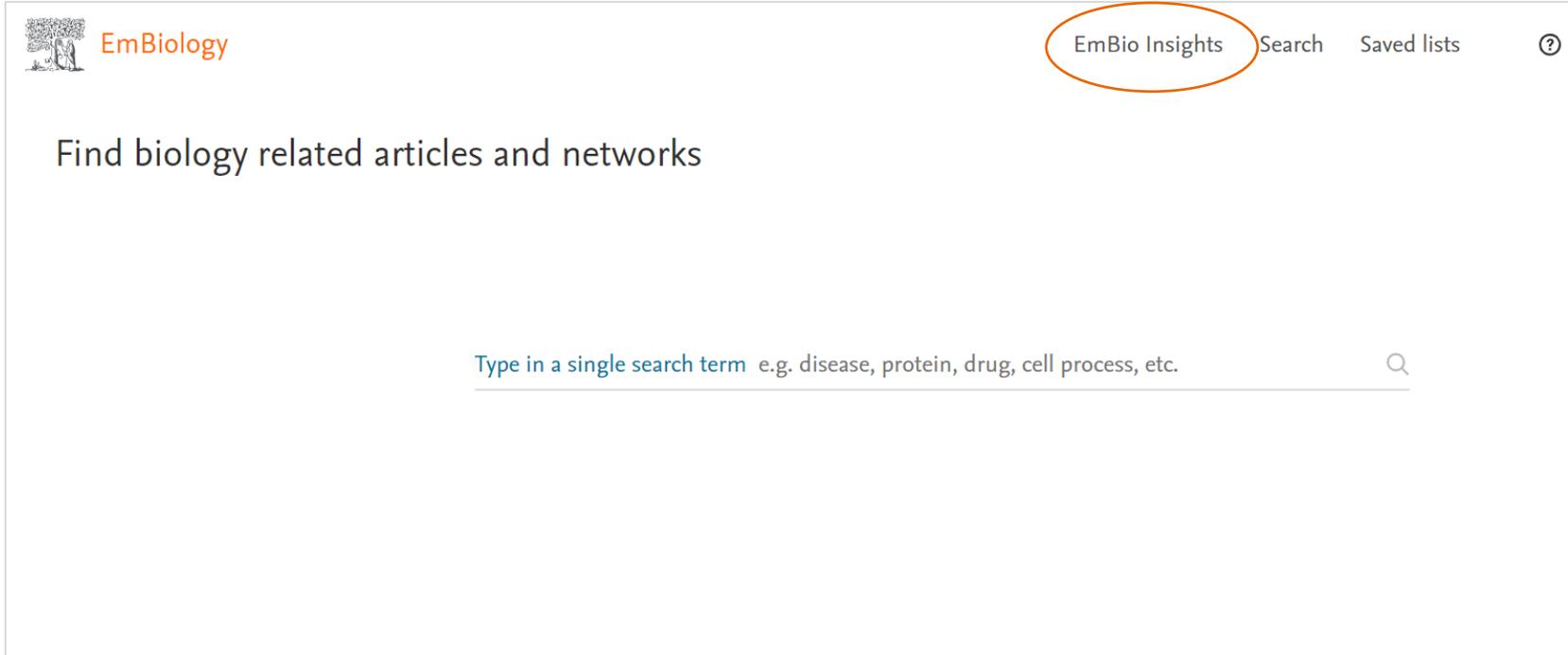
# EmBiology Insights guide, including NEW filter options

(Refer to pages 9-12 for new filter workflow)

March 2024

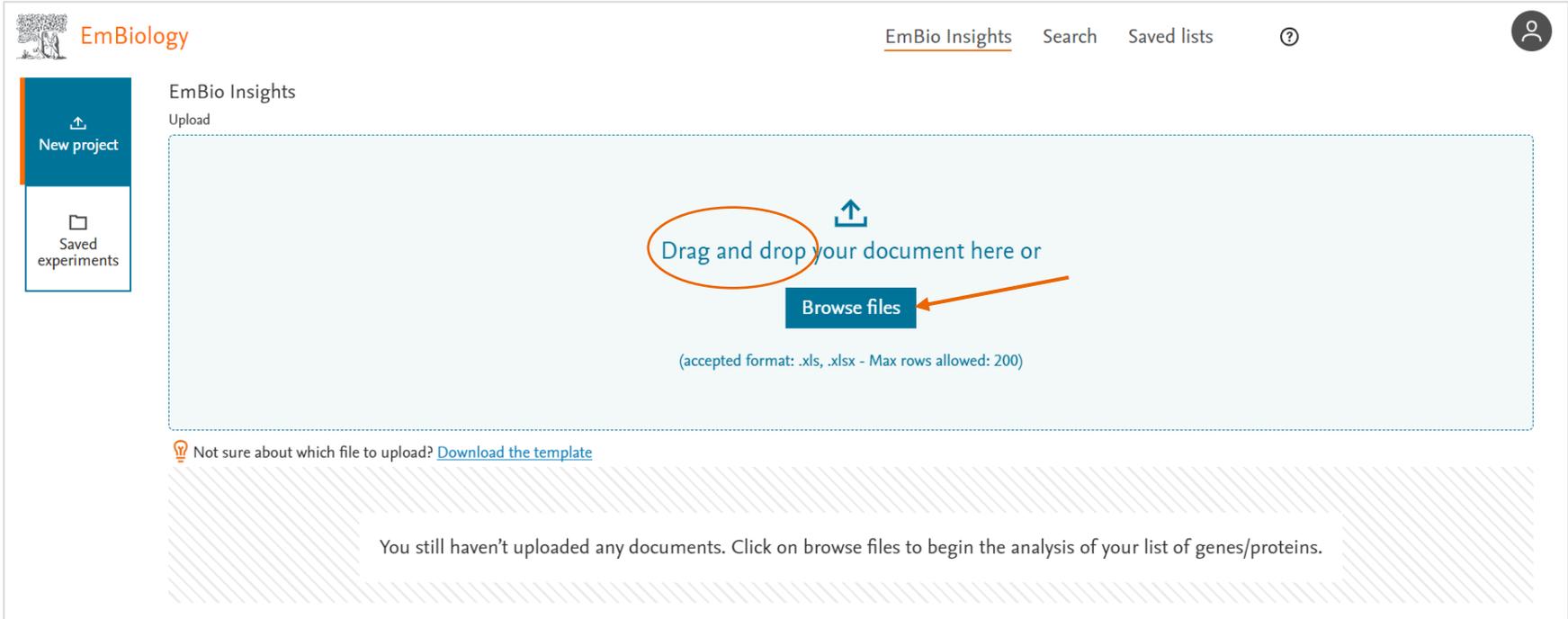


# Select EmBio Insights to upload and find information about multiple genes/proteins\*

A screenshot of the EmBio Insights web interface. The top left corner shows the EmBio logo and the text "EmBiology". The top right corner has a navigation bar with "EmBio Insights" circled in orange, followed by "Search", "Saved lists", and a help icon. Below the navigation bar, the text "Find biology related articles and networks" is displayed. At the bottom, there is a search input field with the placeholder text "Type in a single search term e.g. disease, protein, drug, cell process, etc." and a magnifying glass icon on the right.

\* Genes and proteins fall into the same concept type in EmBiology – for the remainder of this guide, they will be referred to as Proteins

# Uploading list of proteins



The screenshot shows the EmBio Insights web interface. On the left, there is a sidebar with 'New project' and 'Saved experiments' options. The main area is titled 'EmBio Insights Upload' and features a large light blue box with a dashed border. Inside this box, there is an upload icon, the text 'Drag and drop your document here or', and a 'Browse files' button. An orange circle highlights the text, and an orange arrow points to the 'Browse files' button. Below the box, there is a help link: 'Not sure about which file to upload? [Download the template](#)'. At the bottom, a message states: 'You still haven't uploaded any documents. Click on browse files to begin the analysis of your list of genes/proteins.'

EmBio Insights

Upload

Drag and drop your document here or

Browse files

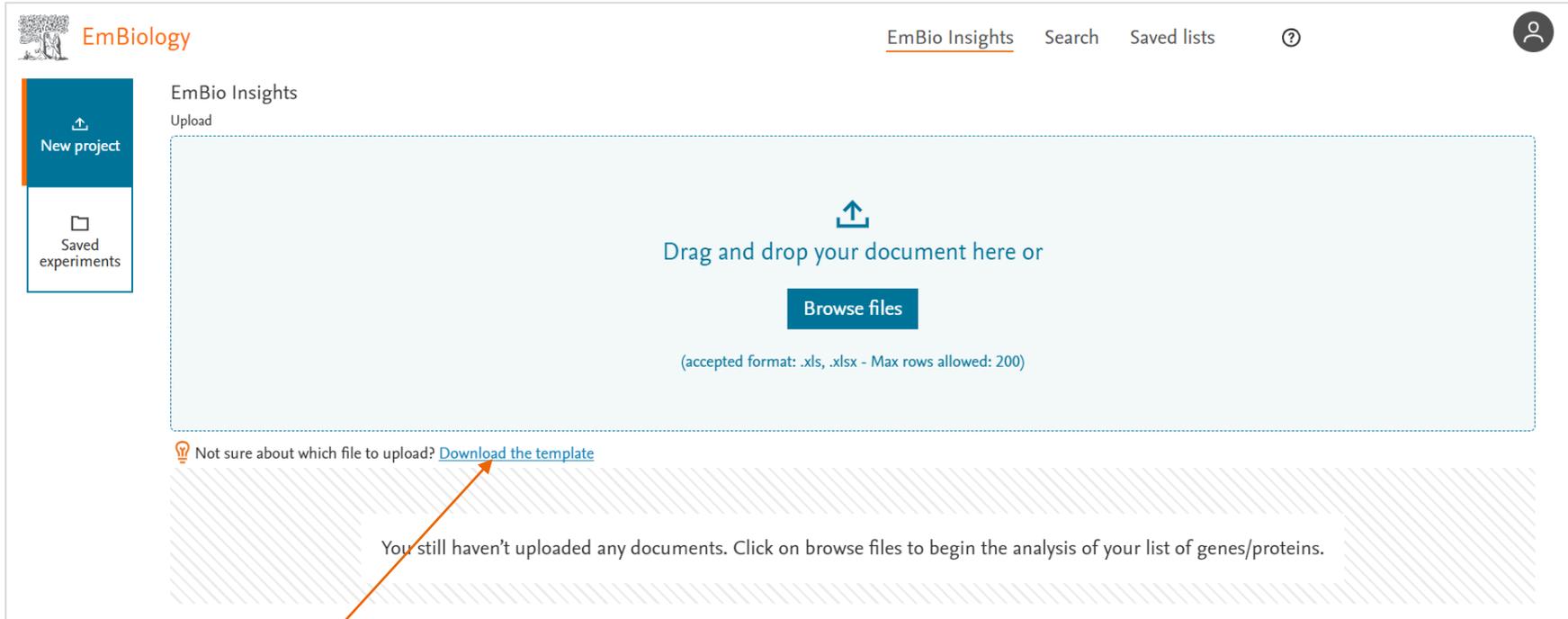
(accepted format: .xls, .xlsx - Max rows allowed: 200)

Not sure about which file to upload? [Download the template](#)

You still haven't uploaded any documents. Click on browse files to begin the analysis of your list of genes/proteins.

Drag files into the centre of the page or upload documents by clicking 'Browse files'  
You can upload a list of up to 200 proteins in an xls or xlsx format

# Uploading list of proteins



EmBiology

EmBio Insights   Search   Saved lists   ?

EmBio Insights

Upload

New project

Saved experiments

Drag and drop your document here or

Browse files

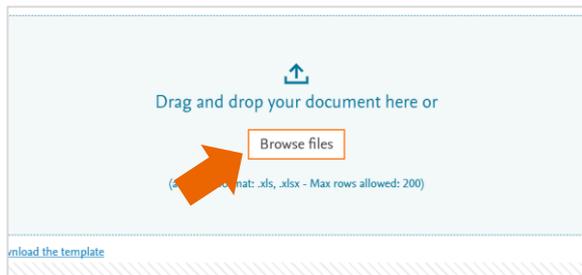
(accepted format: .xls, .xlsx - Max rows allowed: 200)

Not sure about which file to upload? [Download the template](#)

You still haven't uploaded any documents. Click on browse files to begin the analysis of your list of genes/proteins.

See an example of what the file should look like by clicking 'Download the template'

# E.g., browse files to upload and map to the database



Name	Status
Alopecia short list_200	✓
Gene list for experiment upload_visualisation	✓
Gene list for experiment upload_visualisation	✓
Chord diagram data for upload	✓
List of preset relationships that correspond to fil...	✓

Uploads

List name	Status	Date ↓
1. Alopecia short list_200.xlsx 	 Analyzing...	11/09/2023 

Click edit icon to enter your experiment description.

 Upload successful. Mapping in progress. ✕

Information is shown that indicates a successful upload. **'Analyzing'** status indicates the proteins in the list are being mapped to the database

Uploads

List name	Status	Date ↓
1. Alopecia short list_200.xlsx 	 Completed	11/09/2023  <span style="background-color: #0056b3; color: white; padding: 2px 5px; border-radius: 3px;">Open analysis</span>

Click edit icon to enter your experiment description.

**'Completed'** status indicates mapping is done. Select 'Open analysis' to proceed to the next step

# Edit the file name and provide a description

## Uploads

List name	Status	Date ↓	
1. Alopecia short list_200.xlsx 	● Completed	11/09/2023	<a href="#">Open analysis</a> 
<p>Click edit icon to enter your experiment description.</p>			

Click the pencil icon to edit file name or add/edit a description

Click 'Open analysis' to see information about each protein in your list

10 | 20 | 30

< Previous 1 Next >

## Uploads

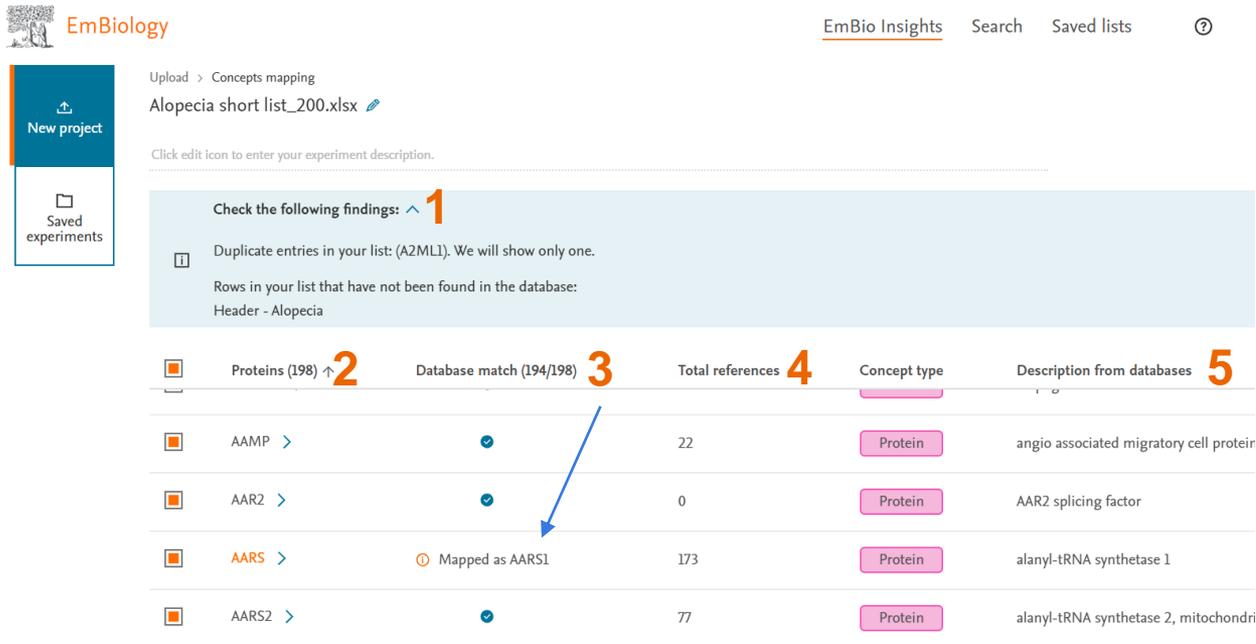
List name	Status	Date ↓	
1. Alopecia short list_200_edited name 	● Completed	11/09/2023	<a href="#">Open analysis</a> 
<p>this is a description of the experiment</p>			

Click the checkmark icon when done

10 | 20 | 30

< Previous 1 Next >

# The concepts mapping list shows proteins from your list mapped to the EmBiology database and includes information on each protein



The screenshot shows the EmBiology interface for a project named 'Alopecia short list\_200.xlsx'. It displays a 'Check the following findings' section with one finding: 'Duplicate entries in your list: (A2ML1). We will show only one. Rows in your list that have not been found in the database: Header - Alopecia'. Below this is a table with columns: Proteins (198), Database match (194/198), Total references, Concept type, and Description from databases. The table lists four proteins: AAMP, AAR2, AARS, and AARS2. A blue arrow points to the 'Database match' column for AARS, which shows 'Mapped as AARS1'.

Proteins (198)	Database match (194/198)	Total references	Concept type	Description from databases
AAMP	✓	22	Protein	angio associated migratory cell proteir
AAR2	✓	0	Protein	AAR2 splicing factor
AARS	⊕ Mapped as AARS1	173	Protein	alanyl-tRNA synthetase 1
AARS2	✓	77	Protein	alanyl-tRNA synthetase 2, mitochondri

1. Duplicates and terms that can't be matched with proteins found in the EmBiology database are shown in the header
2. Number of proteins successfully mapped to the database
3. In some cases, the protein name in the uploaded list is a synonym of the preferred term – cases where the protein is mapped to a differently named term is clearly indicated
4. Total number of references refers to the number of articles/clinical trials where the protein is mentioned
5. A short description of the protein

# Click on the > beside the protein name to get a detailed description of function, primary cell location and organism the protein is found in

Click on < to close the info panel

Click on the Name to go to EmBiology search (in a new tab)

 Duplicate entries in your list: (A2MLL). We will show only one.

Rows in your list that have not been found in the database:  
Header - Alopecia

	Proteins (198)	Database match (194/198)	Total references	Concept type	Description
	A2MLL >		42	Protein	alpha-2
	A4GALT >		82	Protein	alpha 1,
	AAAS >		107	Protein	aladin V
	AACS >		114	Protein	acetoac
	AADA3 >		0	Protein	arylacet
	AADAT >		232	Protein	aminoac
	AAED1 >		4	Protein	peroxin
	...		--	...	...

**Description:**  
This gene encodes a member of the alpha-macroglobulin superfamily. The encoded protein is thought to be an N-glycosylated monomeric protein that acts as an inhibitor of several proteases. It has been shown to form covalent interactions with proteases, and has been reported as the p170 antigen recognized by autoantibodies in the autoimmune disease paraneoplastic pemphigus (PNP; PMID:20805888). Mutations in these gene have also been associated with some cases of Noonan syndrome (NS; PMID:24939586) as well as some cases of otitis media (PMID:26121085). Alternative splicing results in multiple transcript variants encoding different isoforms. [provided by RefSeq, Aug 2015]

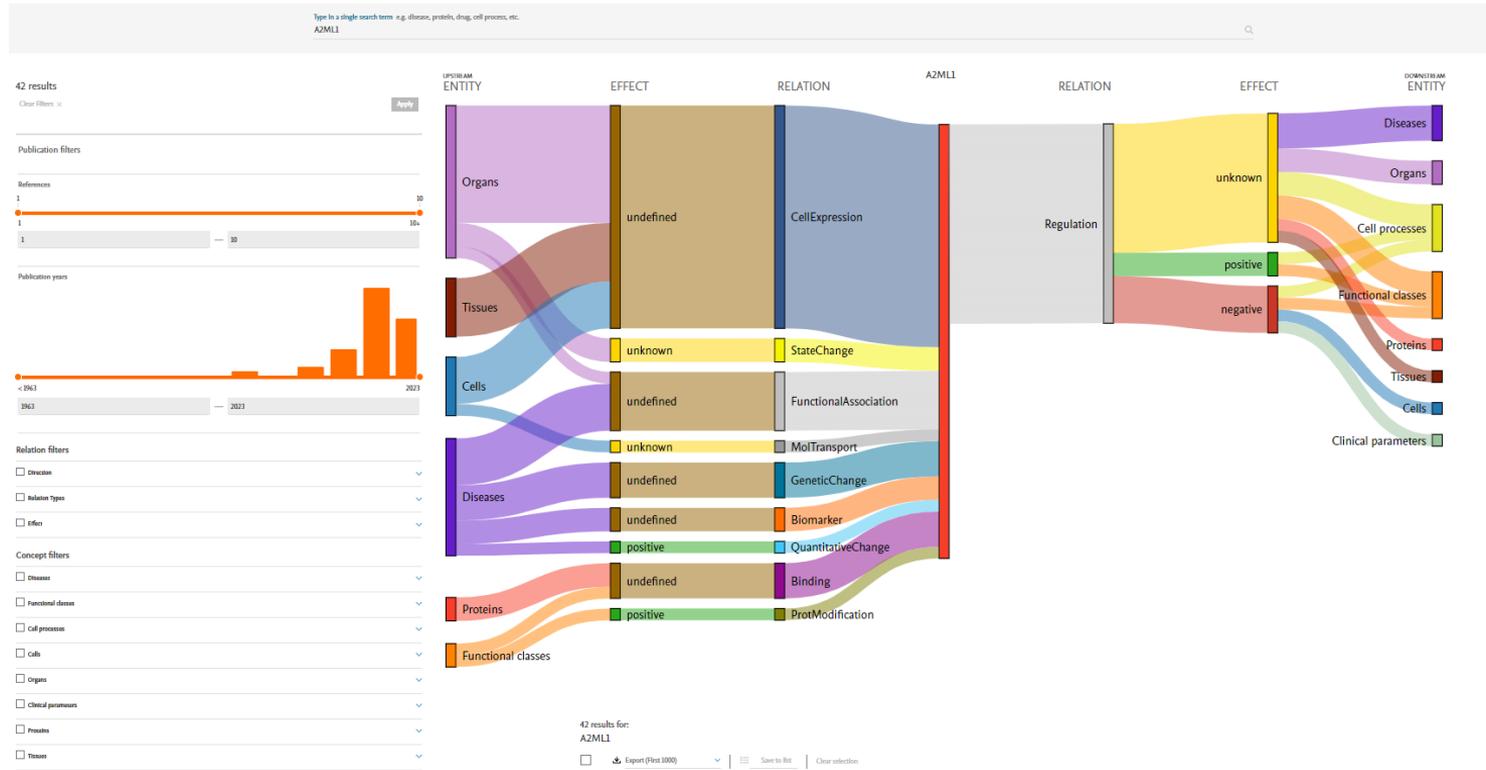
**Primary Cell Localization:**  
Extracellular

**Organism:**  
Homo sapiens (human)

**Type:**  
Protein

**Total references:** 42

# Clicking on the protein name in the information panel opens the EmBiology Search in a new tab



# To see relationships for all proteins on your list, click find connections – or (*new*) apply additional filters

 Proteins (198)	Database match (196/198)	Total references	Concept type	Description from databases
 A2ML1 >		43	Protein	Alpha-2-macroglobulin like 1
 A4GALT >		84	Protein	Alpha 1,4-galactosyltransferase (p blood group)
 AAAS >		107	Protein	Aladin wd repeat nucleoporin
 AACS >		115	Protein	Acetoacetyl-coa synthetase
 AADACL3 >		0	Protein	Arylacetamide deacetylase like 3
 AADAT >		237	Protein	Aminoadipate aminotransferase
 AAED1 >		4	Protein	Peroxiredoxin like 2c
 ... >		...	...	...

Use the scrollbar to see all proteins in your list



Click 'Find connections' to skip filters and immediately see relationships for all proteins on your list – skip to slide 13 for this workflow

Find connections

Apply filters

Apply filters to narrow down your list of proteins before identifying connections for the proteins in your list

# Applying filters to your uploaded list of proteins

Upload > Concepts mapping > Apply filters

Alopecia short list\_200.xlsx

Apply filters

New project

Saved experiments

+ Add Filter

198 results >

Skip filters

**Add filter** ×

- Cell where protein is expressed >
- Diseases associated with proteins >
- Organ where protein is expressed >
- Primary cell localization >
- Protein function >
- Tissue where protein is expressed >

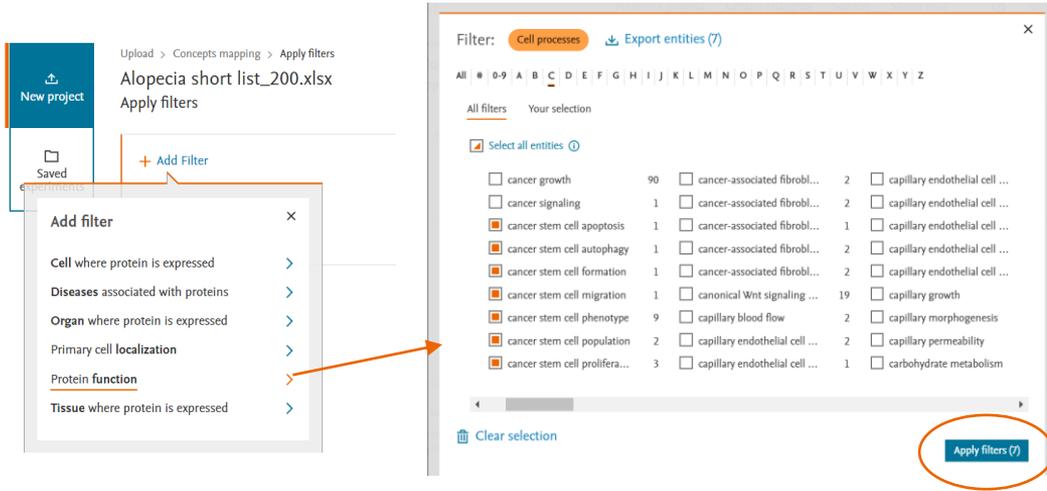
Click + Add Filter to add a filter that will narrow down the number of proteins that will be analysed, based on filter selections

Number of proteins that will be analysed

Skip filters to directly find relationships for all proteins on your list

- **Cell where protein is expressed:** Shows cells that have a cell expression relationship with proteins from your uploaded list. Selecting items from this filter will reduce the proteins to be analysed by ones known to be expressed in the selected cell types.
- **Diseases associated with proteins:** Shows diseases with a regulation relationship with proteins from your uploaded list. Selecting items from this filter will reduce the proteins to be analysed by ones known to be associated with these diseases.
- **Organ where protein is expressed:** Shows organs that have a cell expression relationship with proteins from your uploaded list. Selecting items from this filter will reduce the proteins to be analysed by ones known to be expressed in the selected organs.
- **Primary cell location:** Shows the primary cell location for proteins from your uploaded list. Selecting items from this filter reduces the proteins to be analysed by ones expressed in the selected locations.
- **Protein function:** Shows cell processes that have a regulation relationships with proteins from your uploaded list. Selecting items from this filter will reduce the proteins to be analysed by ones known to be involved in the selected cell processes.
- **Tissue where protein is expressed:** Shows tissues that have a cell expression relationship with proteins from your uploaded list. Selecting items from this filter will reduce the proteins to be analysed by ones known to be expressed in the selected tissue types

# For example – apply the Protein Function filter



Upload > Concepts mapping > Apply filters  
Alopecia short list\_200.xlsx  
Apply filters

Filter: Cell processes [Export entities \(7\)](#)

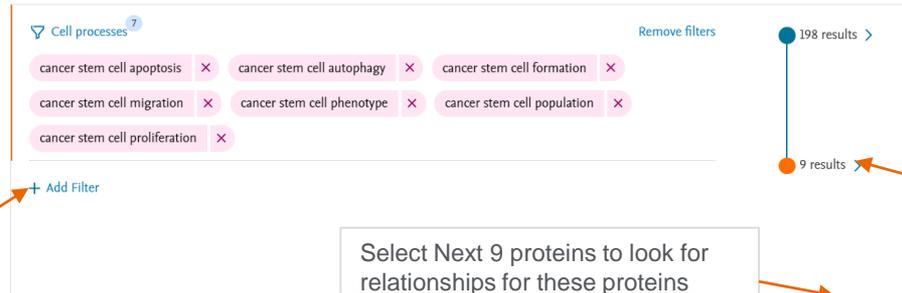
All filters Your selection

Select all entities

<input type="checkbox"/> cancer growth	90	<input type="checkbox"/> cancer-associated fibrobl...	2	<input type="checkbox"/> capillary endothelial cell ...
<input type="checkbox"/> cancer signaling	1	<input type="checkbox"/> cancer-associated fibrobl...	2	<input type="checkbox"/> capillary endothelial cell ...
<input checked="" type="checkbox"/> cancer stem cell apoptosis	1	<input type="checkbox"/> cancer-associated fibrobl...	1	<input type="checkbox"/> capillary endothelial cell ...
<input checked="" type="checkbox"/> cancer stem cell autophagy	1	<input type="checkbox"/> cancer-associated fibrobl...	2	<input type="checkbox"/> capillary endothelial cell ...
<input checked="" type="checkbox"/> cancer stem cell formation	1	<input type="checkbox"/> cancer-associated fibrobl...	2	<input type="checkbox"/> capillary endothelial cell ...
<input checked="" type="checkbox"/> cancer stem cell migration	1	<input type="checkbox"/> canonical Wnt signaling ...	19	<input type="checkbox"/> capillary growth
<input checked="" type="checkbox"/> cancer stem cell phenotype	9	<input type="checkbox"/> capillary blood flow	2	<input type="checkbox"/> capillary morphogenesis
<input checked="" type="checkbox"/> cancer stem cell population	2	<input type="checkbox"/> capillary endothelial cell ...	2	<input type="checkbox"/> capillary permeability
<input checked="" type="checkbox"/> cancer stem cell prolifera...	3	<input type="checkbox"/> capillary endothelial cell ...	1	<input type="checkbox"/> carbohydrate metabolism

[Clear selection](#) [Apply filters \(7\)](#)

Upload > Concepts mapping > Apply filters  
Alopecia short list\_200.xlsx  
Apply filters



[Add Filter](#)

Cell processes <sup>7</sup> [Remove filters](#)

198 results >

9 results >

[Next 9 Proteins](#)

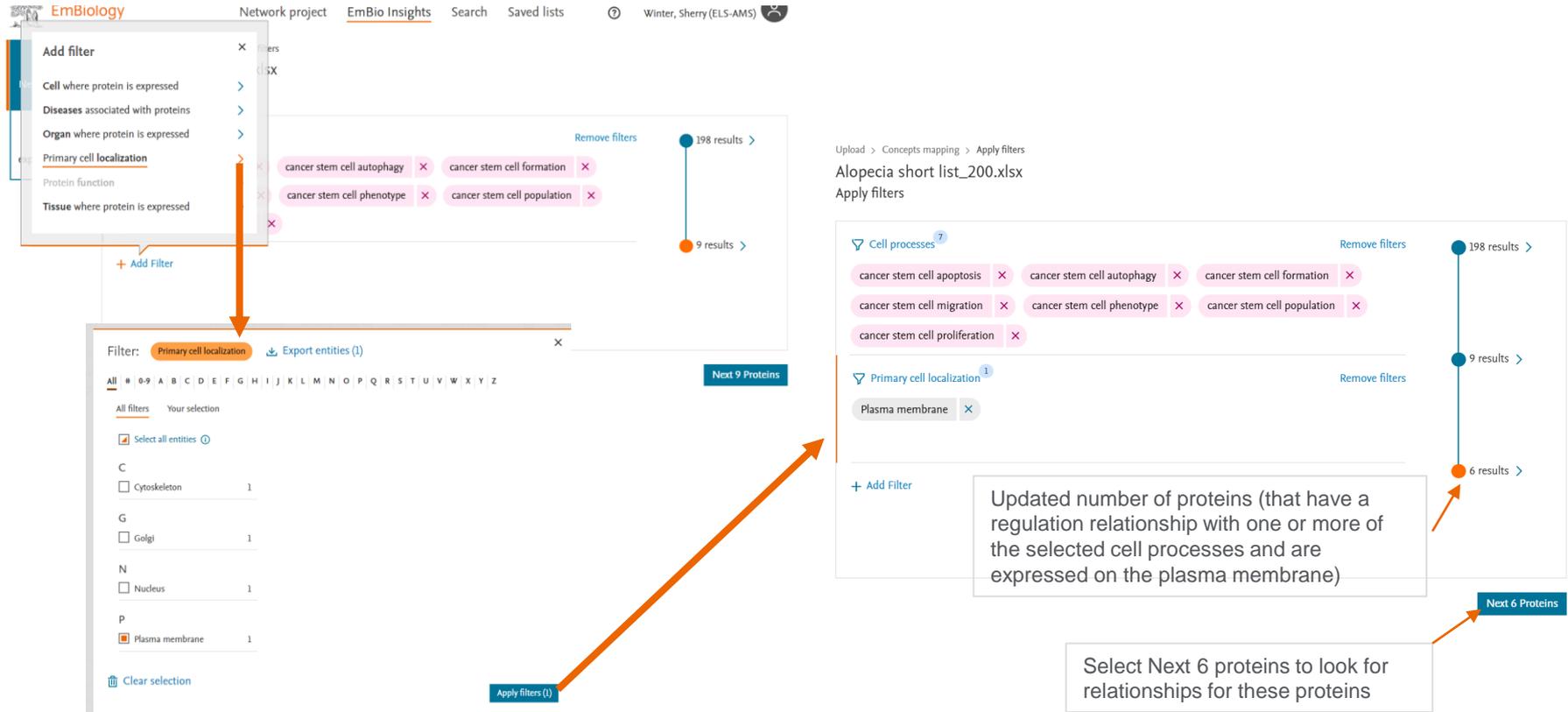
The selected cell processes (protein functions) are shown. Individual ones can be removed if required

Click + Add Filter to apply another filter to the remaining list of 9 proteins

Select Next 9 proteins to look for relationships for these proteins

Updated number of proteins (that have a regulation relationship with one or more of the selected cell processes)

# For example – apply a 2<sup>nd</sup> (protein localization) filter



EmBio Insights Network project EmBio Insights Search Saved lists Winter, Sherry (ELS-AMS)

**Add filter**

- Cell where protein is expressed
- Diseases associated with proteins
- Organ where protein is expressed
- Primary cell localization**
- Protein function
- Tissue where protein is expressed

Remove filters 198 results >

cancer stem cell autophagy x cancer stem cell formation x

cancer stem cell phenotype x cancer stem cell population x

9 results >

+ Add Filter

Filter: Primary cell localization Export entities (1)

All filters Your selection

Select all entities

C

Cytoskeleton 1

G

Golgi 1

N

Nucleus 1

P

Plasma membrane 1

Clear selection

Apply filters (1)

Next 9 Proteins

Upload > Concepts mapping > Apply filters

Alopecia short\_list\_200.xlsx

Apply filters

Cell processes 7

Remove filters 198 results >

cancer stem cell apoptosis x cancer stem cell autophagy x cancer stem cell formation x

cancer stem cell migration x cancer stem cell phenotype x cancer stem cell population x

cancer stem cell proliferation x

9 results >

Primary cell localization 1

Remove filters

Plasma membrane x

6 results >

+ Add Filter

Updated number of proteins (that have a regulation relationship with one or more of the selected cell processes and are expressed on the plasma membrane)

Next 6 Proteins

Select Next 6 proteins to look for relationships for these proteins

# Select the question to investigate, which will define the relationships searched

New project

Saved experiments

Upload > Concepts mapping > Apply filters > Find connections

Alopecia short list\_200.xlsx

Select a question

I'm looking for... Find Q

- Diseases associated with proteins in my list ⓘ
- Diseases that are positively regulated by proteins on my list ⓘ
- Diseases that have known biomarkers in my list ⓘ
- Diseases that have (potential) novel biomarkers in my list ⓘ
- Cell processes regulated by proteins in my list ⓘ
- Expression targets (proteins) regulated by proteins in my list ⓘ
- Common regulators (proteins) of proteins in my list ⓘ
- Drugs that directly interact with proteins in my list ⓘ
- Drugs that regulate proteins in my list ⓘ

Filters applied: downstream direction, positive effect, Regulation relationship

Click 'i' to see the relationships that are applied to address each question



# EmBiology Insights – discover relationships for multiple terms at one time

The chart shows the first 25 results connected with the highest number of proteins from the list. Switch to table view and select different items to adjust the results. Close x

Chart view Table

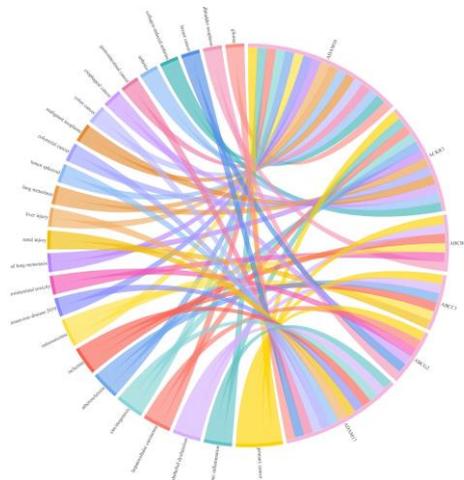


Chart view Table

313 results found for your selection (25 Diseases)

Export (First 1000)  Save to list  Clear selection

1. Quinacrine and Curcumin in combination decreased the breast cancer angiogenesis by modulating ABCG2 via VEGF A  
*Journal of Cell Communication and Signaling*, volume 17, Pages 609-636, 1 September 2023  
D. Nayak, S. Paul, C. Das, S. Bhal, C.N. Kundu  
[Relations: 3](#) [Abstract](#) [Full text](#)
2. Molecular aspects of ABCB1 and ABCG2 in Gallbladder cancer and its clinical relevance  
*Molecular and Cellular Biochemistry*, volume 478, Pages 2379-2394, 1 October 2023  
Nimisha, S.S. Solaja, K.C. Sharma, P.K. Nekarankanti, Apurva, A. Kumar, R.S.A. Sottas, H. Anjum, V.V. Bhat, S.A. Husain  
[Relations: 2](#) [Abstract](#) [Full text](#)
3. Probing the bioactive compounds of *Kigelia africana* as novel inhibitors of TNF- $\alpha$  converting enzyme using HPLC/GCMS analysis, FTIR and molecular modelling  
*Journal of Biomolecular Structure and Dynamics*, volume 41, Pages 12839-12862, 2023  
K. Olofsson, F. Okuwali, K. Karigidi, S. Shityakov, O. Iwaloje  
[Relations: 1](#) [Abstract](#) [Full text](#)
4. Silencing circular RNA hsa\_circABCC1 inhibits osteosarcoma progression through down-regulating HDAC4 via sponging miR-591  
*Environmental Toxicology*, volume 38, Pages 1545-1576, 1 July 2023  
K. Wang, N. Wang, J. Liu, J. Zhou, S. Lei, H. Yin, H. Fang, K. Feng, X. Kang  
[Relations: 1](#) [Abstract](#) [Full text](#)

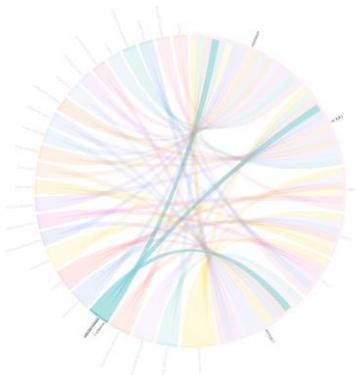
- The top 25 associations (based on number of protein connections) is shown by default, along with associated literature
- You can adjust the associations by clicking on table view, which will include the top 500 associations, and making a different selection
- The list of literature at the bottom of the visual includes all literature supporting the relationships shown in the visual
  - Results include information on relations, abstract and link to full text (information is the same as EmBiology search results)

Applying filters to the visual 

# EmBiology Insights – discover relationships for multiple terms at one time

① The chart shows the first 25 results connected with the highest number of proteins from the list. Switch to table view and select different items to adjust the results. Close x

Chart view Table view



Clicking on 1 (or more) specific diseases applies a filter for the list of literature results

- Clicking on 1 (or more) specific diseases applies a filter for the list of literature results
  - For example, the literature supporting relationships between a single disease and proteins from your list that have a relationship with that disease

Chart view Table view

- Export (First 1000)  Save to list
1. Tetraspanin-29 activates Notch signaling by interacting with AD1  
Biochemistry and Cell Biology, volume 100, Pages 292-300, 1 August 2022  
S. Yuan, Y. Yin, K. Wang, H. Zhou, C. Qian  
[Relations: 1](#) [Abstract](#) [Full text >](#)
  2. Expression profile and prognostic value of CXCR family members  
World Journal of Surgical Oncology, volume 20, 1 December 2022  
Y. Shan, C. Zhou, Y. Cao, Q. Li, H. Deng, S. Gu, Y. Wu, Z. Shan  
[Relations: 1](#) [Abstract](#) [Full text >](#)
  3. Atypical chemokine receptor 3 induces colorectal tumorigenesis dependent rRNA biogenesis  
Acta Pharmacologica Sinica, volume 43, Pages 2967-2976, 1 November 2022  
J. Yang, R.-R. Miao, Y.-M. Li, T. Pan, S.-H. Wu, X.-J. Qiu, S.-X. Cui  
[Relations: 1](#) [Abstract](#) [Full text >](#)
  4. Polyfunctionality of the CXCR4/CXCL12 axis in health and disease  
immune-mediated diseases  
FASEB Journal, volume 35, 1 April 2021  
C. Britton, M.C. Poznansky, P. Reeves  
[Relations: 1](#) [Abstract](#) [Full text >](#)

< Close

Relations Abstract

Relation N°1 1 snippet ^

ACKR3 has a positive "Regulation" relationship with carcinogenesis.  
[16 References >](#)

Snippet 1 of 1  
ACKR3 can be activated by a number of endogenous ligands, including CXCL12, leading to many pathophysiological processes, including chronic inflammation, inflammation-driven tumorigenesis, tumour metastasis, chronic neurodegenerative disorders of the central nervous system, and even embryogenesis [7-9].

Secondary relations

Secondary Relation N°1 1 snippet v

ACKR3 has a "FunctionalAssociation" relationship with clinical stage.  
[9 References >](#)

Secondary Relation N°2 1 snippet v

carcinogenesis has a "FunctionalAssociation" relationship

# Table view: Detailed information for up to 500 results

I'm looking for...

Diseases that are positively regulated by proteins on my list

Chart view **Table view**

0/234 diseases

Clear selection

- primary cancer 5 protein connection
- chronic inflammation 3 protein connection
- endothelial dysfunction 3 protein connection
- hepatocellular carcinoma 3 protein connection
- carcinogenesis 3 protein connection
- atherosclerosis 3 protein connection
- ischemia 3 protein connection
- osteosarcoma 3 protein connection
- coronavirus disease 2019 2 protein connection
- gastrointestinal toxicity 2 protein connection
- experimental lung metastasis 2 protein connection
- renal injury 2 protein connection

1.  primary cancer 5 protein connection

Proteins	Description	Localization	Protein class	References	Literature
ADAM10 >	Adam metallopeptidase domain 10	Plasma membrane	Protein	1	<a href="#">Articles</a>
ACKR3 >	Atypical chemokine receptor 3	Plasma membrane	Receptor	1	<a href="#">Articles</a>
ABCB1 >	Atp binding cassette subfamily b member 1	Plasma membrane	Transporter	1	<a href="#">Articles</a>
ABCC1 >	Atp binding cassette subfamily c member 1	Plasma membrane	Transporter	1	<a href="#">Articles</a>
ABCG2 >	Atp binding cassette subfamily g member 2 (junior blood group)	Plasma membrane	Transporter	1	<a href="#">Articles</a>

2.  chronic inflammation 3 protein connection

3.  endothelial dysfunction 3 protein connection

4.  hepatocellular carcinoma 3 protein connection

5.  carcinogenesis 3 protein connection

By default, the top 25 results (based on connections with proteins from the list) are shown in the visual. Users can make other selections for the visual and see the complete list of results (up to 500) in the table

Within each table row, details on individual proteins are seen, including the description, localisation, protein class and number of references supporting the relationship of the protein with the result. A link takes the user to a page with the list of literature supporting the relationship.

Note: information in the table will be made exportable in Q1 2024