

PART 2 - MEROPS

2.1 - Peptidase

Make a bookmark to

<http://merops.sanger.ac.uk/>

From the left frame, click on the Clan identifier link. This lists all of the Clans in *MEROPS*.

Question: How many clans are there in each of the different catalytic types?

Now go to the CA clan. This page displays information about the clan and the type example. Below this, there is a list of all of the family members. The table at the bottom of the pages also shows the species distribution of the sequences in each of the clan families.

Click on the "alignment" button at the top of the CA clan page.

This shows an alignment of each of the family type examples.

Question: Which of the catalytic residues are invariant in the alignment?

Now go back to the clan page. Follow the link to the calpain family, C2.

Browse the pages for this family. The summary page gives a detail description of the calpain family. The alignment and tree derived from this alignment are also available. The "Genomes" section contains a list of completed genomes. Shown in blue are those completed genomes containing a C2 homologue, with those that do not contain a C2 homologue shown in black.

Question: How many completed genomes contain C2 homologues?

Now go to the Structure link. This takes you to a 2D representation of the diagram. Click on the PDB accession, e.g. 1DF0. This displays the structure and the 2D representation.

Click on the Search link from the left frame.

Select "What peptidase can cleave this bond ?" from the list of items under "Search by Specificity..."

Enter in the VAL-GLU-ALA-LEU+TYR-LEU into the query.

Question: Which peptidases can cleave this bond ?

Alter the substrate and see what peptidases can cleave it.

Now go back to the search section and select - What cleavages does this peptidase make ? Select any peptidase to view what substrate is cleaved.

BLAST *MEROPS*. Cut and paste the following sequence into the blast merops page.

```
>YFP
MKWLLLLLGLVALSECIMYKVPLIRKKSRLRRTLSEGLLLKDFLKKHNLNPARKYFPQWEA
PTLVDEQPLENYLDMEYFGTIGAQDFTVVFDTGSSNLWVPSVYCSSLACTNHNRFNPED
SSTYQSTSETVSITYGTGSMTGILGYDTVQVGGISDTNQIFGLSETEPGSFLYYAPFDG
ILGLAYPSISSGATPVFDNIWNQGLVSSVYLSADDQSGSVVIFGGIDSSYYTGSLNWV
PVTVEGYWQITVDSITMNGEAIACAEGCQAIVDVTGTSLLTGPTSPIANIQSDIGASENS
DGMVVSCSAISSLPDIVFTINGVQYPVPPSAYIILQSEGSCISGFQGMNLPTESGELWI
LGDVFIRQYFTVFD RANNQVGLAPVA
```

Question: What peptidase family does this sequence belong to?

2.2 - Inhibitors

Now switch to the inhibitors part of *MEROPS*.

As with the peptidase section, select the clan identifier link. Browse through the inhibitors clan list and find an inhibitor of interest. Write a brief description of an inhibitor family that includes the following:

1. Title/Name of Inhibitor
2. Clan
3. Family Name
4. Type Example
5. Number of Sequences in the Family
6. List of any known structures