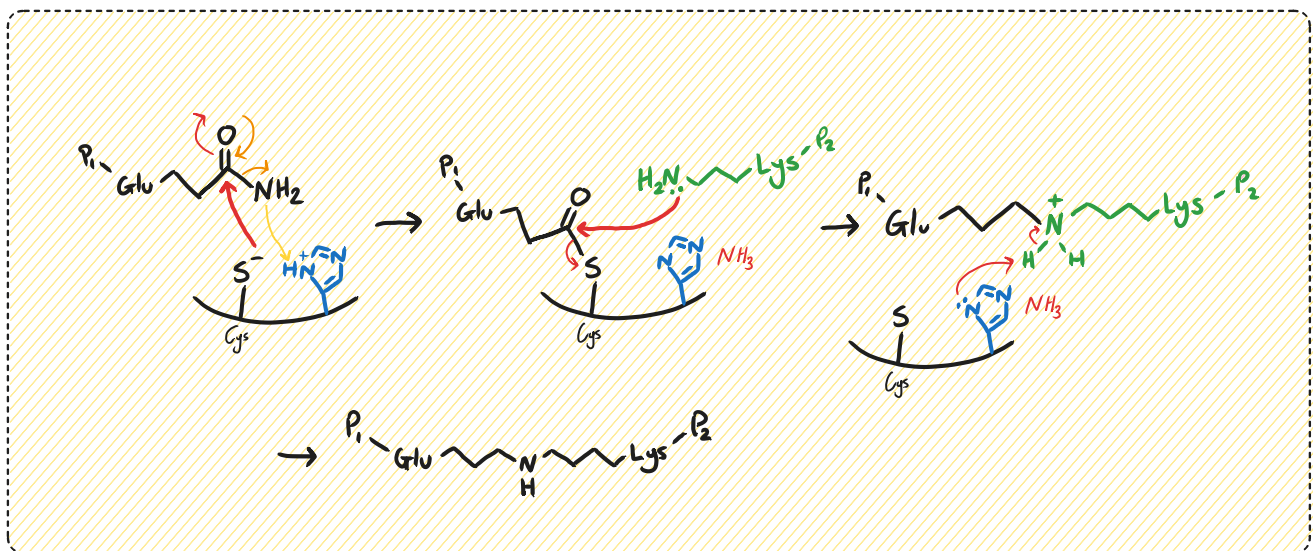


Transglutamination occurs by crosslinking of a glutamine side chain to a lysine side chain at the terminal amide and amino groups - respectively. This occurs by the acyl transfer of glutamine to a cysteine residue in the transglutaminase, and then the subsequent removal of the amide NH<sub>2</sub> & protonation by histamine to NH<sub>3</sub>. Then, the resultant thioester provides an ample leaving group for attack of the lysine to the ipso carbon. This produces a peptide bond, thereby fusing two proteins together.



### General Reaction Mechanisms of Transglutaminases

## b) Industrial Processes

What industrial processes utilize transglutaminase?

Are there any other applications for its use?

It is frequently used in "molecular gastronomy" to transform some food into another which has the same taste, but different texture. This is done due to the fact that cross-linking proteins in food can have many different effects on the structure of it, but the chemical composition remains the same, so it still tastes the same.

## c) Is the enzyme used in a kinetically or equilibrium controlled process?

The enzyme is used in a kinetically controlled process because it forms an acyl-enzyme intermediate, as shown in the reaction mechanism in **a**).

## d) EC Numbers

Transglutaminase (EC 2.3.2.13)

- **Class** → Transferase;
- **Subclass** → Transferred Group: Acyl group;
- **Subsubclass** → More information: Aminoacyl group;
- **Serial Number** → protein-glutamine gamma-glutamyltransferase

Source

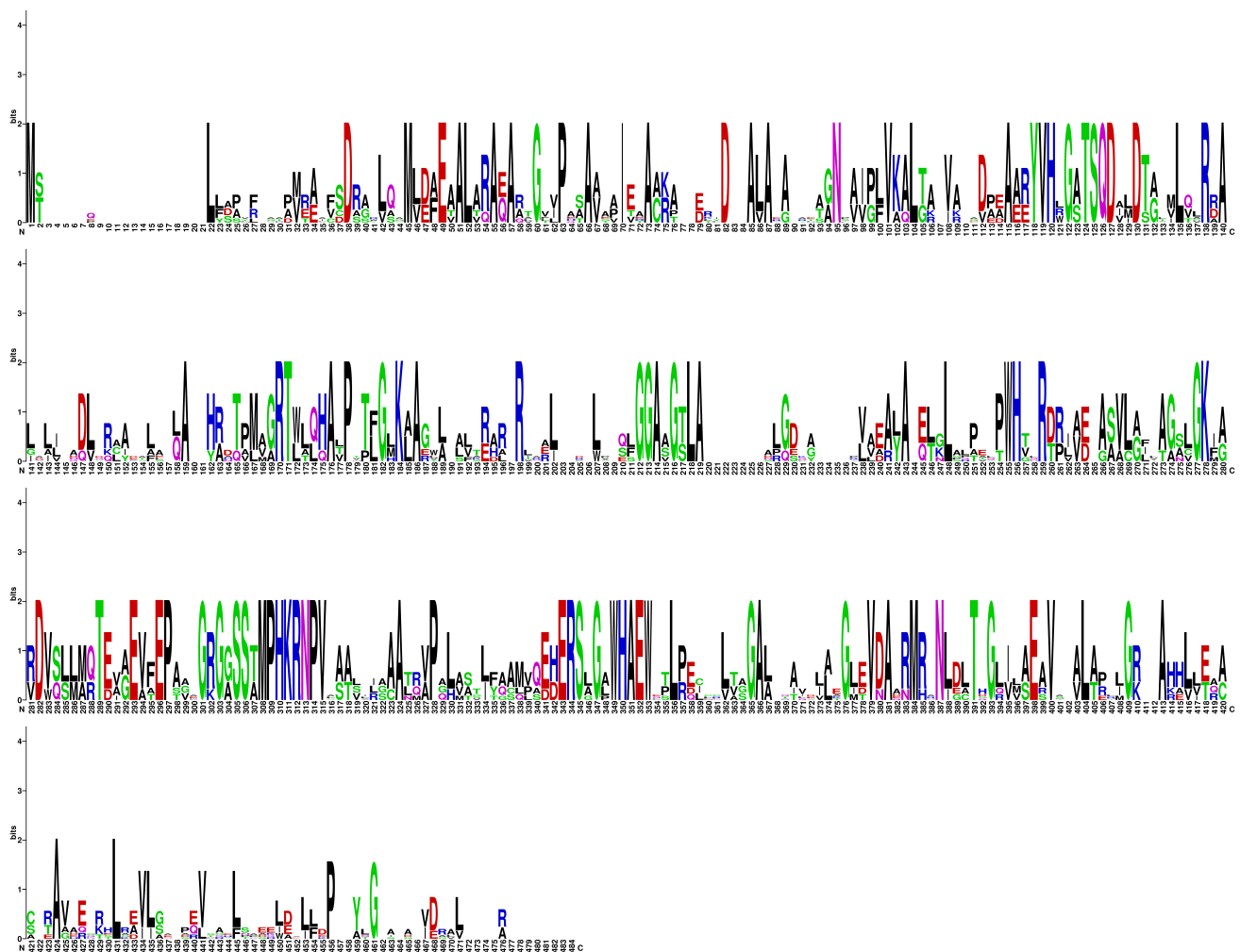
## Question 3

BLAST

After BLASTing, I aligned sequences within 100% to 35% homology.  
This included:

- Nitrosuccinate lyase
  - *S. cremeus*
  - *S. davaonensis*
- 3-carboxymuconate lactonizing enzyme
  - *B. diazoefficiens*
  - *P. aeruginosa*
  - *P. putida*
  - *A. baylyi*

## Weblogo



## Oligonucleotides:

308-315

**MPHKRNPV**

ATG CCN CAY AAR CGN AAY CCN GUN

349-353

**WHAEW**

UGG CAY GCN GAR UGG