

BIO 310 LAB 3

Alper Bingol 23661

1 Crime Investigation

a.

suspect 1: casein
suspect 2: alpha-amylase
suspect 3: metalloprotease
suspect 4: beta-lactoglobulin

b.

origin of casein: Bos Taurus
origin of alpha-amylase: Homo Sapiens
origin of metalloprotease: Crotalus atrox
origin of beta-lactoglobulin: Bos Taurus

c.

Function of suspect 1:

Important role in the capacity of milk to transport calcium phosphate. Antioxidant peptide has 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity. Casein supplies amino acids, [carbohydrates](#), and two essential elements, [calcium](#) and [phosphorus](#).

Function of suspect 2:

Alpha-amylase, (α -amylase) is an [enzyme EC 3.2.1.1](#) that [hydrolyses](#) alpha bonds of large, alpha-linked [polysaccharides](#), such as [starch](#) and [glycogen](#), yielding [glucose](#) and [maltose](#).

Function of suspect 3:

Snake venom zinc metalloprotease that has Aalpha, Bbeta fibrin(ogen)olytic activities.

Function of suspect 4:

Primary component of whey, it binds retinol and is probably involved in the transport of that molecule.

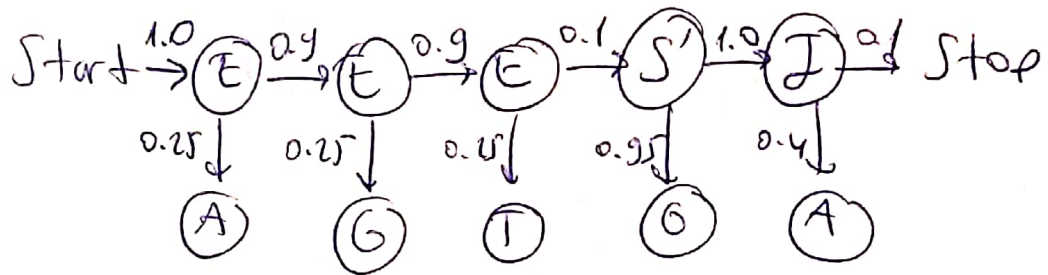
d.

Metalloprotease may be responsible for the death. All other proteins are either in human gene or cow gene. Unless the man have an allergy to those proteins, man could have been died because of the snake venom. Metalloprotease causes cell deaths and it could might man die.

2 Local Alignment

3- + hidden Markov Models

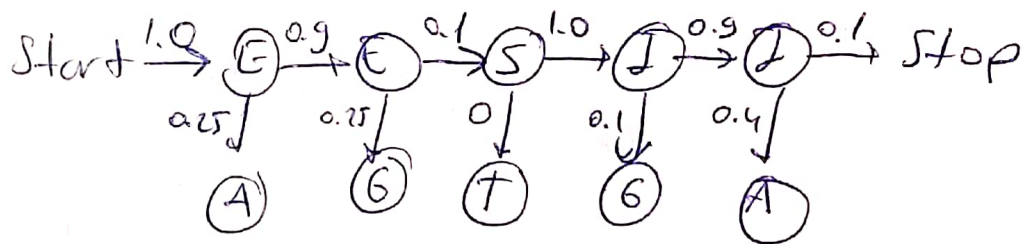
① a) Path 1 =



$$= 1.0 \times 0.25 \times 0.9 \times 0.25 \times 0.9 \times 0.25 \times 0.1 \times 0.95 \times 1.0 \times 0.4 \times 0.1$$

$$= 0.00004809$$

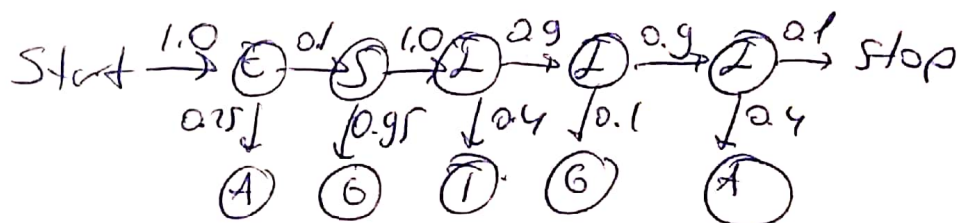
b) Path 2 =



$$= 1.0 \times 0.25 \times 0.9 \times 0.25 \times 0.1 \times 0 \times 1.0 \times 0.1 \times 0.9 \times 0.4 \times 0.1$$

$$= 0$$

c) Path 3 =

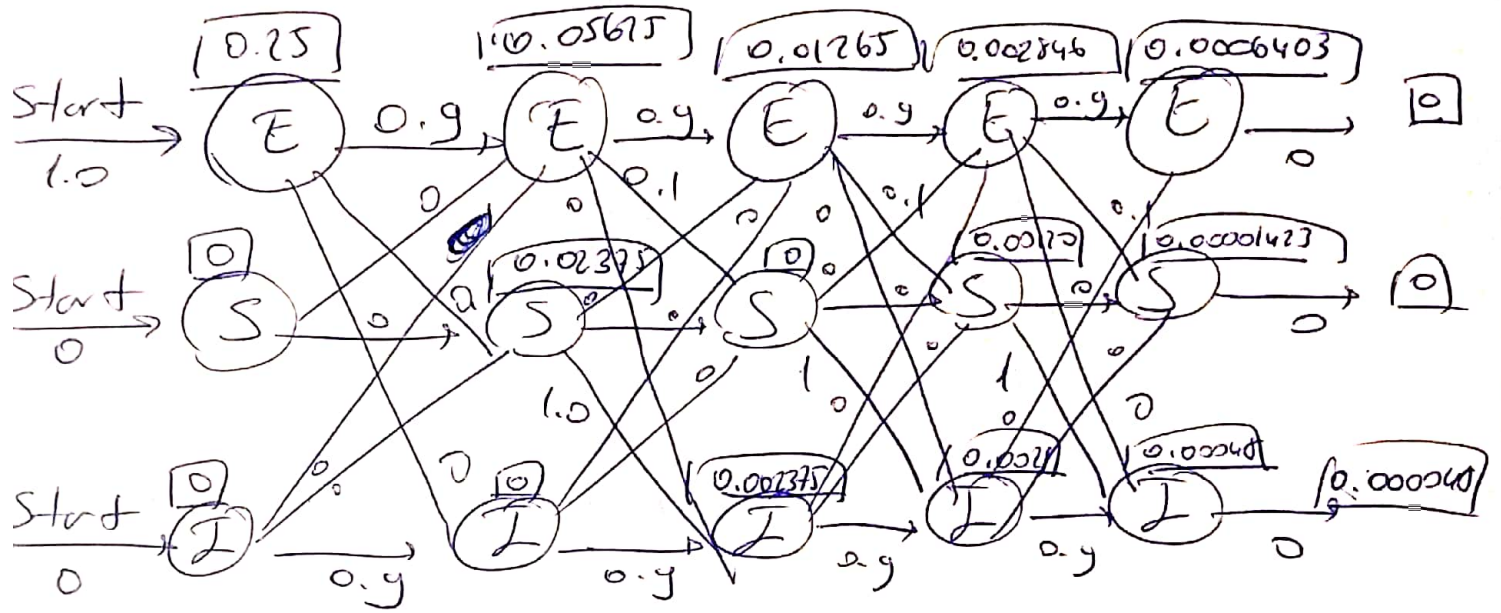


$$1 \times 0.25 \times 0.1 \times 1 \times 0.95 \times 0.9 \times 0.4 \times 0.9 \times 0.1 \times 0.4 \times 0.1$$

$$= 0.00003078$$

② Path 1 is more probable.

② Trellis



$$o_1 = A \quad o_2 = G \quad o_3 = T \quad o_4 = G \quad o_5 = A$$

likelihood of Path 1 = 0.32062

likelihood of Path 2 = 0.306988

likelihood of Path 3 = 0.27683

max is Path 1

↓
most likely

③ Path 1 is max likelihood, so 5 splice site is at the second G.

4th position in the path