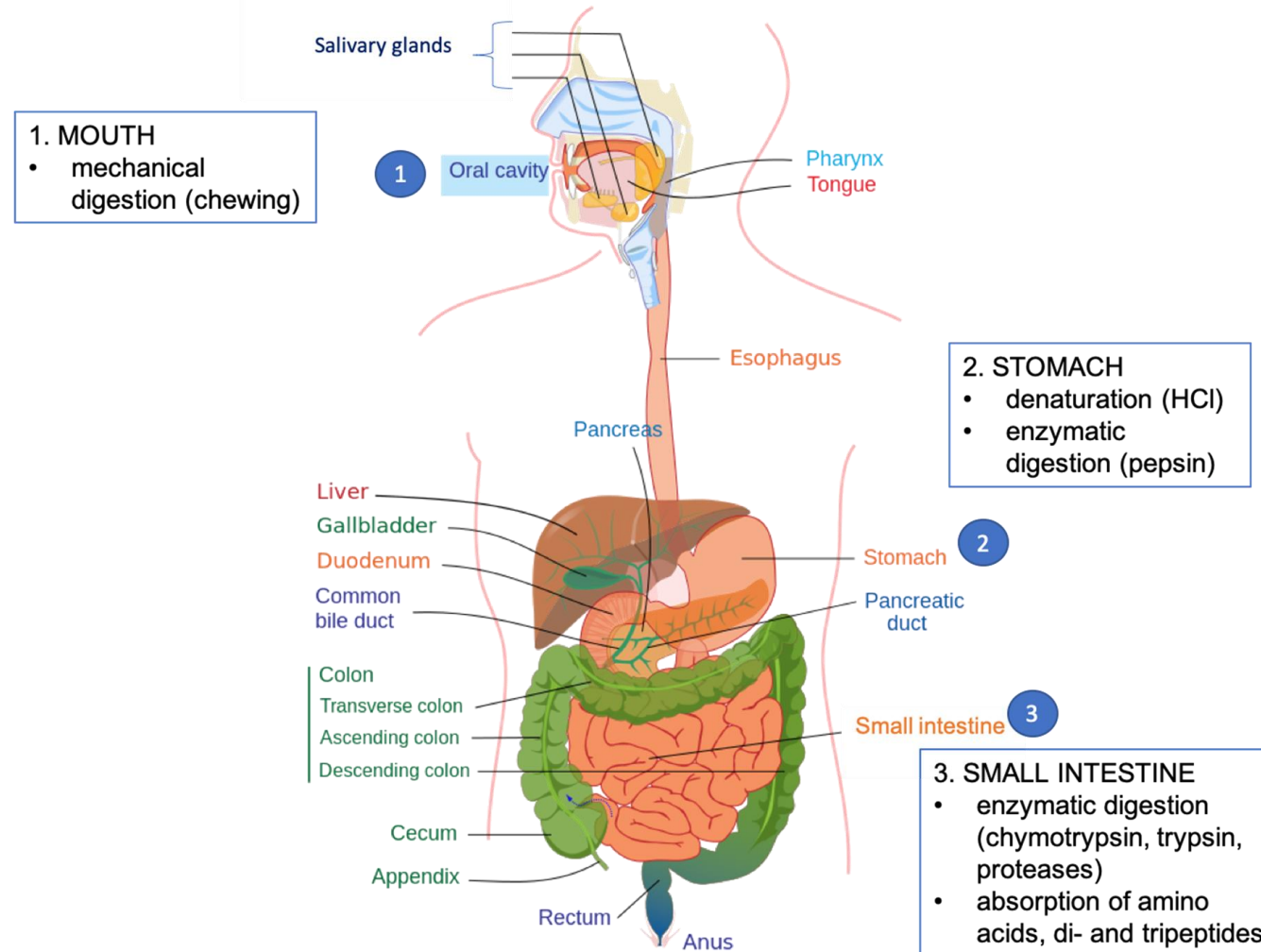


SNS COLLEGE OF NURSING COIMBATORE-35

COURSE : B.Sc., Nursing
SUBJECT : BIOCHEMISTRY
UNIT : III
TOPIC : Protiens
PREPARED BY :Mrs.Mithra.V

DIGESTION, ABSORPTION & METABOLISM OF PROTEINS



PROTEIN DIGESTION IN THE MOUTH

- When you eat food, the body's digestive system breaks down dietary protein into individual amino acids, which are absorbed and used by cells to build other proteins and a few other macromolecules, such as DNA.
- The teeth begin the **mechanical breakdown** of large particles into smaller.
- The salivary glands secrete saliva to aid swallowing and the passage of food.

PROTEIN DIGESTION IN THE STOMACH

- Both mechanical and chemical digestion take place in the stomach.
- The stomach releases gastric juices containing hydrochloric acid and the enzyme, pepsin, which initiate the chemical digestion of protein.
- Muscular contractions, called peristalsis, also aid in digestion.

Chemical Digestion of proteins

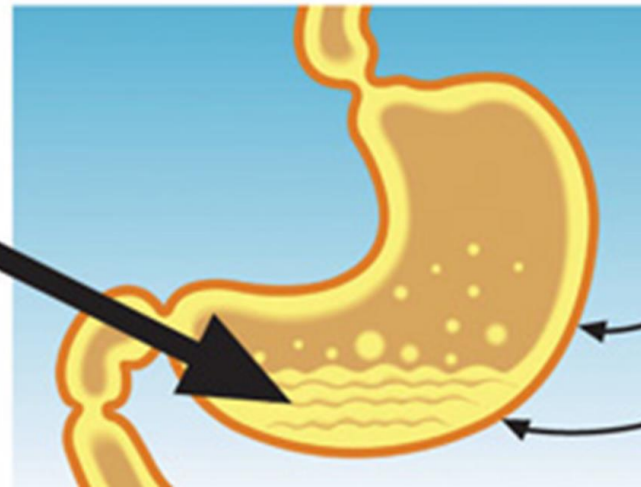
Acid
(Hydrochloric)

Pepsin
(Enzyme)

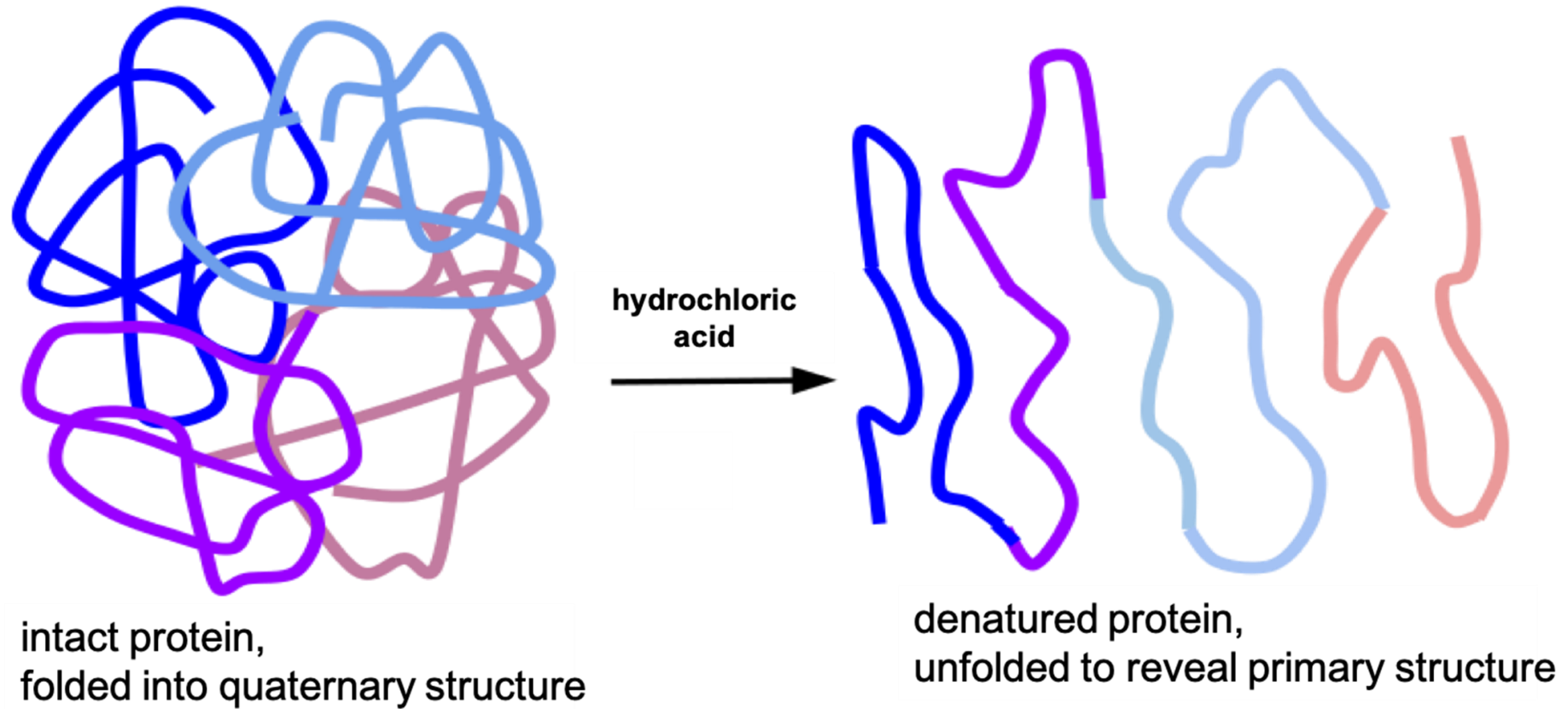
Gastric juices

Mechanical Digestion

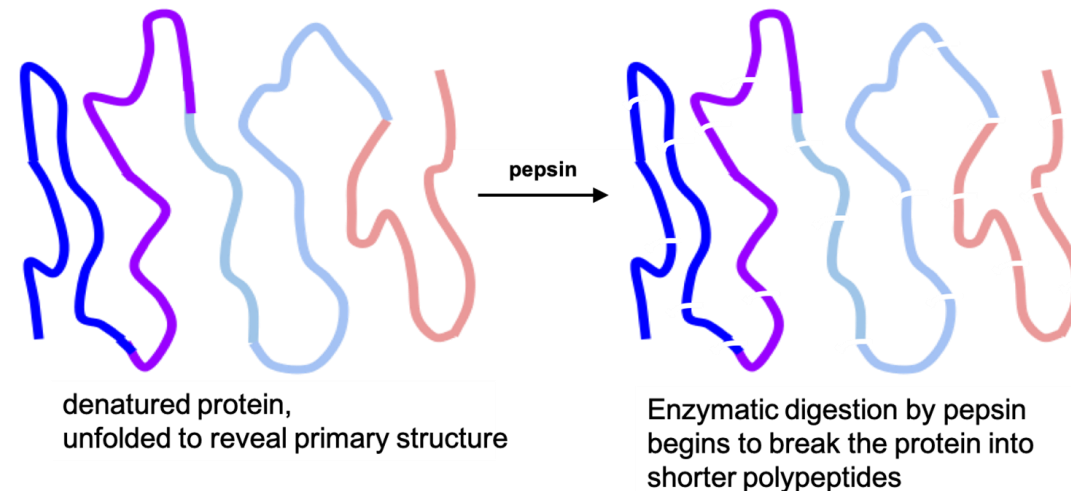
Muscular contractions
(Peristalsis)



- Because of the hydrochloric acid in the stomach, it has a very low pH of 1.5-3.5.
- **The acidity of the stomach causes food proteins to denature, unfolding their three-dimensional structure** to reveal just the polypeptide chain.
- Three-dimensional structure of a protein is essential to its function, so denaturation in the stomach also destroys protein function.

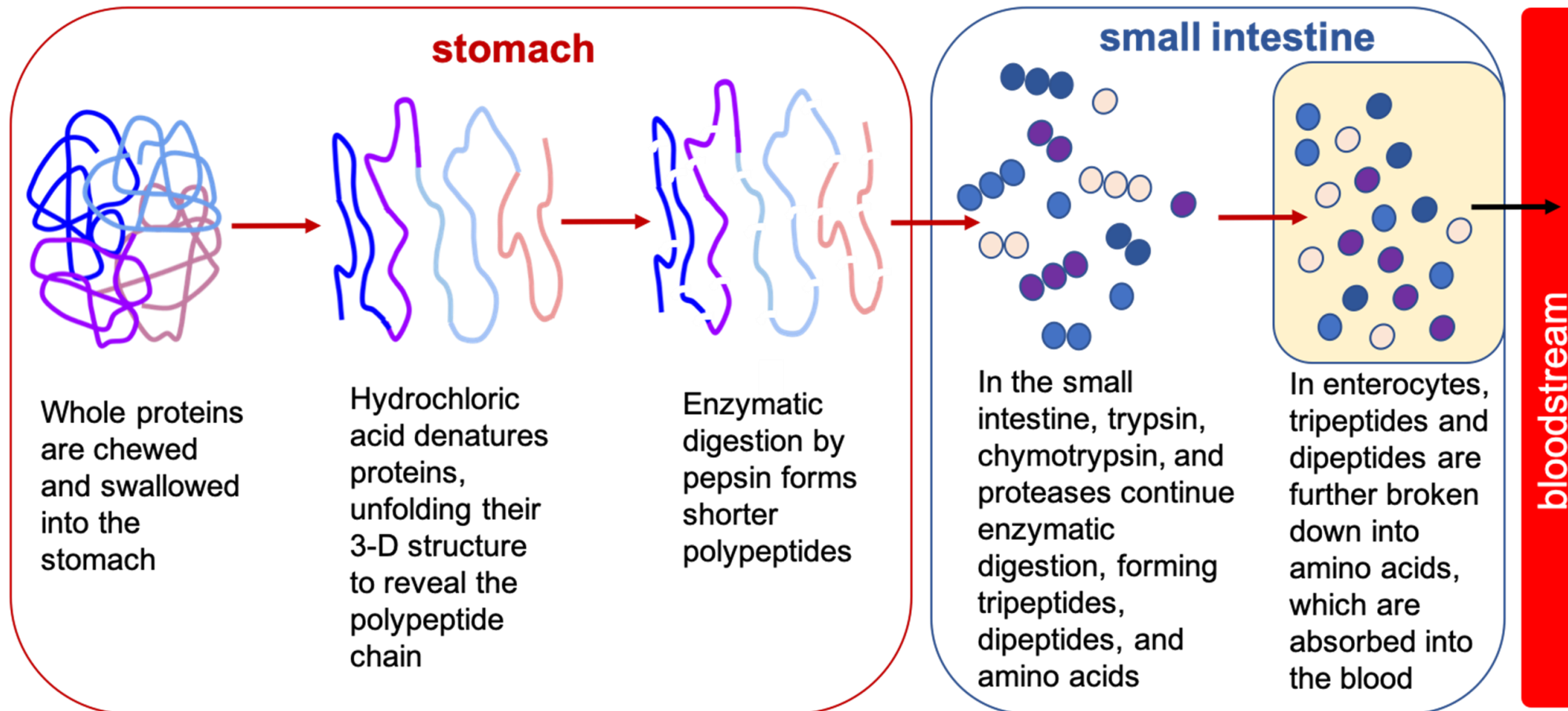


- Once proteins are denatured in the stomach, the peptide bonds linking amino acids together are more accessible for enzymatic digestion.
- That process is started by pepsin, an enzyme that is secreted by the cells that line the stomach and is activated by hydrochloric acid.
- Pepsin begins breaking peptide bonds, creating shorter polypeptides.



PROTEIN DIGESTION AND ABSORPTION IN THE SMALL INTESTINE

- The pancreas secretes digestive juices into the small intestine, and these contain more enzymes to further break down polypeptides.
- The two major pancreatic enzymes that digest proteins in the small intestine are chymotrypsin and trypsin.
- Trypsin activates other protein-digesting enzymes called proteases, and together, **these enzymes break proteins down to tripeptides, dipeptides, and individual amino acids.**



WHAT HAPPENS TO ABSORBED AMINO ACIDS?

- Once the amino acids are in the blood, they are transported to the liver.
- Protein synthesis in cells around the body
- Making nonessential amino acids needed for protein synthesis
- Making other nitrogen-containing compounds
- Rearranged and stored as fat (there is no storage form of protein)
- Rearranged into glucose for fuel for the brain and red blood cells
- Metabolized as fuel, for an immediate source of ATP

1. Anabolism (Protein Synthesis):

- Amino acids are used to build new proteins needed for various bodily functions, including enzymes, hormones and structural components.
- This process involves transcription (DNA to mRNA), mRNA processing, translation (mRNA to protein), and post-translational modifications.

2. Catabolism (Protein Breakdown):

• Transamination:

Amino acids can be converted to other amino acids or keto acids through the transfer of an amino group.

• Deamination:

The amino group is removed from an amino acid, forming ammonia and a keto acid.

• Urea Cycle:

- In order to use amino acids to make ATP, glucose, or fat, the nitrogen first has to be removed in a process called deamination, which occurs in the liver and kidneys.
- The nitrogen is initially released as ammonia, and because ammonia is toxic, the liver transforms it into urea.
- The liver converts ammonia (a toxic byproduct of deamination) into urea, which is then excreted in the urine.

THANK YOU