

Difference Between Protease and Proteinase

www.differencebetween.com

Key Difference – Protease vs Proteinase

Proteins are composed of amino acid monomers made of Carbon, Hydrogen, Oxygen, and Nitrogen. They are macromolecules and are structurally arranged into different levels. Proteins play an important role in both structural and functional properties of the body. Protein is an essential nutrient and can be obtained from both animal and plant food sources. Protein digestion starts in the stomach and ends in the small intestine where it is absorbed and transported to target organs. Protein degradation is also a vital process in many industries including leather industry, wool industry, food industry and in genetic engineering techniques. Protein degradation or proteolysis and is an enzyme-catalyzed reaction taking place with the involvement of a specialized enzyme type known as hydrolases. Protease and Proteinases are two such hydrolases involved in protein degradation. **Proteases are involved in the cleavage of the peptide bond in proteins, causing the degradation of the proteins. Proteinases are a type of protease which is capable of cleaving the internal peptide bonds.** This is the key difference between protease and proteinase.

What is Protease?

Proteases belong to the class of Enzyme commission number 3 (EC3). It is a type of hydrolase and participates in a nucleophilic reaction with the substrate. Protease enzyme activates a nucleophile which will attack the carbon of the peptide bond. This nucleophilic attack will result in the formation of a high-energy intermediate compound which will quickly return to stability by degradation. This will result in the cleavage at the peptide bond, resulting in two fragments of peptides. There are four main types of proteases: aspartic proteases, cysteine proteases, aspartyl proteases and metalloproteases. The method of nucleophilic attack differs in each enzyme class. Proteases are used under natural conditions in protein digestion and under industrial conditions to produce commercial products. Proteases are further divided as exopeptidases and endopeptidases.

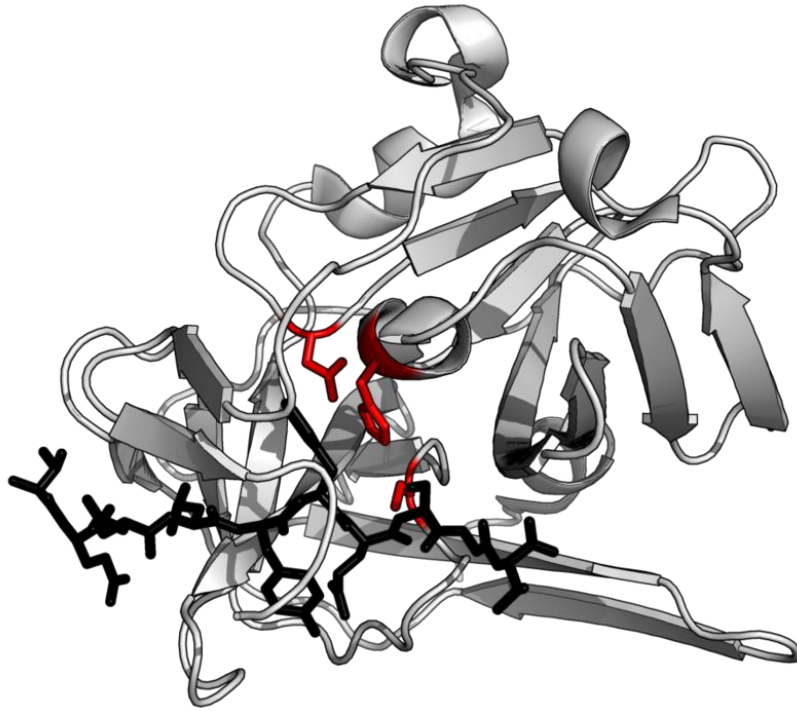


Figure 01: Protease Structure

Industrially, proteases are mainly used in the leather and food industry. At present, proteases are used in the commercial production of many enzymes and other protein production industries. They are also used in the field of biotechnology to facilitate genetic engineering methods.

What is Proteinase?

Proteinase is a type of protease. The action of Proteinase is similar to a protease, and it acts as a hydrolase. Proteinase is an endo-peptidase and participates in cleaving the internal peptide linkages of long peptide chains. These can also be intra-peptide linkages of complex proteins. Proteinases are also important in normal physiological functions and for industrial purposes.

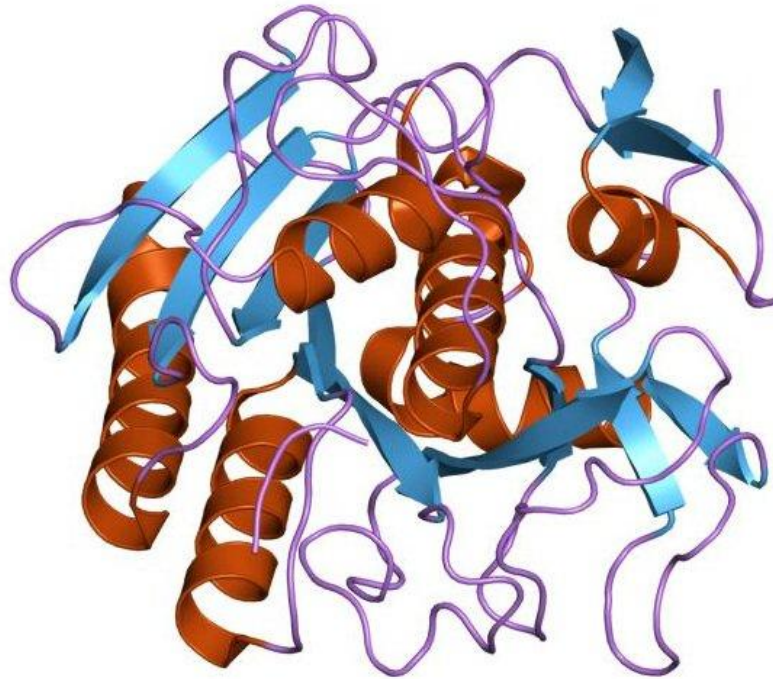


Figure 02: Proteinase K Structure

What are the similarities between Protease and Proteinase?

- Both are hydrolases.
- Both act as proteolytic enzymes.
- Recombinant DNA technology is used at present to produce the both enzymes.
- Both enzymes cleave the peptide bond of proteins and degrading proteins.
- Both enzymes are used in industries – leather industry, wool industry, food industry and recombinant DNA technology and proteomics.
- In physiology, proteases and proteinases are used in the digestion

What is the difference between Protease and Proteinase?

Protease vs Proteinase	
Proteases are the enzymes that cleave peptide bond in proteins.	Proteinases are a type of protease which is capable of cleaving internal peptide links.
Action	
Proteases can be endo- peptidases or	Proteinases are endo-peptidases.

exo-peptidases.

Summary – Protease vs Proteinase

Proteases and Proteinases are proteolytic hydrolases which are used and manufactured commercially for a variety of purposes. Proteases are the enzymes which cleave peptide bond in proteins. Proteinases are a type of protease that cleave internal peptide links. This is the basic difference between proteases and proteinases.

References:

1. Mótyán, JánosAndrás, et al. “Research Applications of Proteolytic Enzymes in Molecular Biology.” *Biomolecules*, MDPI, Dec. 2013, [Available here](#). Accessed 15 Sept. 2017.
2. “Structural Biochemistry/Enzyme Catalytic Mechanism/Proteases.” *Structural Biochemistry/Enzyme Catalytic Mechanism/Proteases - Wikibooks*, [Available here](#). Accessed 15 Sept. 2017.

Image Courtesy:

1. “TEV Protease Summary” By Thomas Shafee – Thomas, Shafee, (2014). “Evolvability of a viral protease: experimental evolution of catalysis, robustness and specificity”. PhD Thesis. University of Cambridge ([CC BY 4.0](#)) via [Commons Wikimedia](#)
2. “[PDB 1pek EBI](#)” By Jawahar Swaminathan and MSD staff at the European Bioinformatics Institute – displayed [here](#) (Public Domain) via [Commons Wikimedia](#)

How to Cite this Article?

APA: Difference Between Protease and Proteinase. (2017, September 26). Retrieved (date), from <http://differencebetween.com/difference-between-protease-and-vs-proteinase/>

MLA: "Difference Between Protease and Proteinase" *Difference Between.Com*. 26 September 2017. Web.

Chicago: “Difference Between Protease and Proteinase.” *Difference Between.Com*. <http://differencebetween.com/difference-between-protease-and-vs-proteinase/> accessed (accessed [date]).



Copyright © 2010-2017 Difference Between. All rights reserved