Datasheet

Transglutaminase >6u/mg

Catalog: ER1014
Cas No.:80146-85-6
Molecular Weight: 76.6kDa
Storage instruction: 20°C
Alias: TG；Transglutaminase； Protein-Glutamine-γ-Glutamyltransferase；Protein-glutamine:amine γ-glutamyltransferas

Description: Transglutaminase is a calcium-dependent enzyme that primarily catalyzes cross-linking reactions between protein molecules, forming stable covalent bonds. This cross-linking reaction plays an important role in many physiological processes in living organisms, including blood coagulation, tissue repair, and extracellular matrix formation. TGase is widely found in animals, plants, and microorganisms. Among them, TGase from animals (such as pigs, cows, and fish) and microorganisms (such as Gram-negative bacteria) is commonly used in scientific research and industrial applications.

Scientific Applications:

Protein Modification and Labeling:

TGase can link various amines to the glutamine residues on proteins, causing proteins to cross-link or be modified. This characteristic is widely utilized in protein labeling research. For example, by attaching fluorescent labels or other reporter molecules to proteins, it facilitates the study of protein dynamics and interactions.

Tissue Engineering and Regenerative Medicine:

In tissue engineering, TGase is used to construct extracellular matrices and scaffolds, promoting cell adhesion and growth. Researchers use TGase-prepared biomaterials to simulate natural matrices, developing artificial organs and tissue repair technologies.

Disease Research:

TGase plays a crucial role in the mechanism studies of various diseases (such as celiac disease and Huntington's disease). TGase-induced protein cross-linking is a key factor in the pathological processes of these diseases. Therefore, studying TGase activity and regulation mechanisms helps uncover the pathogenesis of these diseases and develop new therapeutic strategies.

Food Science:

Although more inclined towards industrial applications, TGase research in the field of food science is also significant. Researchers use TGase to alter the structure and texture of proteins, developing new food formulations, and improving the texture and nutritional value of food.

Scientific Applications:

High Specificity:

TGase has high specificity for glutamine and amino acid residues, ensuring reaction precision and effectiveness.

Multifunctionality:

TGase can act on various proteins and peptides, with applications in biomedical, material science, and food science fields.

Stability:

TGase is supplied in freeze-dried powder form, which has good stability and can be stored long-term at low temperatures, facilitating experimental operations for researchers.

Amino Acid Specificity:

TGase primarily modifies and cross-links the glutamine (Gln) residues in proteins. Additionally, TGase can also catalyze the following amino acid residues:

Lysine:

TGase can cross-link glutamine with lysine residues, forming ε-(γ-glutamyl)-lysine cross-links. This cross-linking plays a crucial role in protein structure stability.

Cysteine:

In certain circumstances, TGase can act on cysteine residues, forming isothiocyanate derivatives.

Histidine:

TGase can also catalyze reactions between glutamine and histidine residues, although this reaction is relatively rare.

Unit Definition:

One unit of Transglutaminase is capable of catalyzing the formation of 1.0 μmole of hydroxamate per minute from Nα-Z-Gln-Gly and hydroxylamine at 37°C and pH 6.0.