

# PRODUCT DATA SHEET

## Recombinant Human $\alpha$ -synuclein Monomer Protein (Type I)

SKU: TDD-1002

### Product Details

**Catalog Number:** TDD-1002

**Organism:** *Homo Sapiens*, Human

**Protein Type:** Recombinant, Wild Type

**Protein Construction:** Human SNCA (Uniprot: P37840) (Met1-Ala140) expressed no tag

**Purity:** >96% SDS-PAGE;  $\geq 98\%$  as determined by SEC

**Expression System:** *Escherichia coli*

**Applications:** WB, SDS-PAGE, In vivo assay, In vitro assay

**Biologically active:** Yes

**Endotoxin** <1.0 EU per  $\mu\text{g}$  protein as determined by the LAL method.

**Storage buffer:** 20 mM Tris-HCl, pH 8.0, 150 mM NaCl

**Specifications:** Form Liquid

### Storage Conditions & Shipment

**Storage:** -80C for long term storage; avoid freeze / thaw cycle

**Product Format/Shipped:** Dry Ice

### Safety Precaution

**PLEASE READ BEFORE HANDLING ANY FROZEN VIALS.** *This product is an active protein and may elicit a biological response in vivo. Please wear appropriate Personal Protection Equipment (lab coat, thermal gloves, safety goggles and a face shield) when handling.*

## Description

Human  $\alpha$ -Synuclein Monomer is a small, intrinsically disordered protein primarily expressed in neurons, especially in dopaminergic cells in the brain. It plays a key role in synaptic function, including regulating neurotransmitter release and vesicle trafficking. In its monomeric form,  $\alpha$ -synuclein is unstructured and flexible, allowing it to interact with lipid membranes and participate in synaptic processes.

However,  $\alpha$ -synuclein has a tendency to misfold and aggregate under certain conditions, forming toxic oligomers and fibrils, which are a hallmark of Parkinson's disease and other synucleinopathies. The accumulation of these aggregates leads to neurodegeneration and the formation of Lewy bodies, which disrupt neuronal function.

## Sequence Information

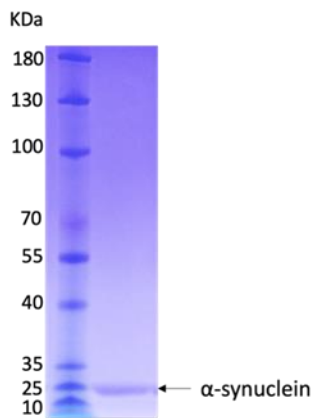
### Amino acid sequence

MDVFMKGLSKAKEGVVAAAEKTKQGVAEAAGKTKEGVLYVGSKTKEGVVHG  
VATVAEKTKEQVTNVGGAVVTGVTAVAQKTVEGAGSIAAATGFVKKDQLGKN  
EEGAPQEGILEDMPVDPDNEAYEMPSEEGYQDYEPEA\*

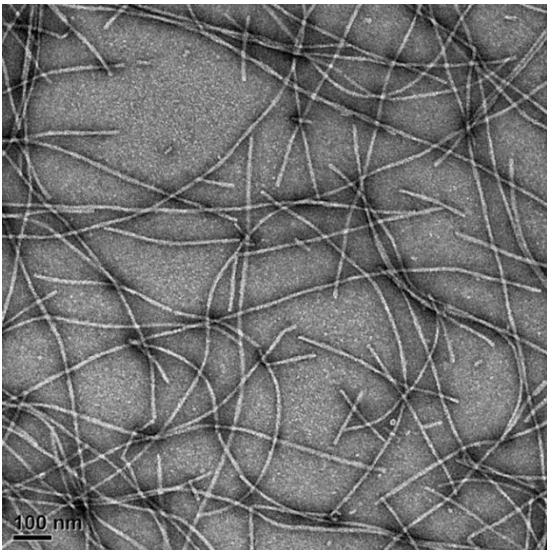
**Protein length:** Full Length

**Amino acids:** 1 to 140

## Product Data



**Figure 1,** SDS-PAGE - Recombinant Human  $\alpha$ -synuclein Monomer Protein: 1ug by SDS-PAGE under reducing condition and visualized by coomassie blue staining, showing a single band at 19 kDa.



**Figure 2,** TEM of Human  $\alpha$ -synuclein Pre-formed Fibrilsat (PFFs): TEM micrograph (left) illustrates the formation of human  $\alpha$ -synuclein pre-formed fibrils, which appear as long, unbranched, and linear fibrillar aggregates. The fibrils exhibit a characteristic diameter of approximately X nm and distinct, periodic cross- $\beta$  sheet structures. and distinct fibrillar structures. The fibrils appear as elongated, thread-like aggregates, consistent with the known features of amyloid fibrils. Scale bar: 100 nm.

## Applications

### 1. Neurodegenerative Disease Research:

Parkinson's Disease:  $\alpha$ -Synuclein monomer is widely used in studying the early stages of Parkinson's disease and other synucleinopathies. Understanding how the monomeric form of the protein behaves and its potential to aggregate into toxic oligomers and fibrils provides insights into disease mechanisms and helps identify targets for early intervention.

### 2. Modeling Protein Aggregation:

Researchers use recombinant human  $\alpha$ -synuclein monomer to study protein misfolding and aggregation. These studies help explore how  $\alpha$ -synuclein transitions from its functional monomeric form to pathological aggregates that form Lewy bodies, a hallmark of Parkinson's disease.

### 3. Drug Discovery and Screening:

Target for Drug Development:  $\alpha$ -Synuclein monomer is a critical target in the development of therapeutics aimed at inhibiting or preventing its aggregation. Screening for small molecules, peptides, or antibodies that can prevent the aggregation of  $\alpha$ -synuclein is an active area of research for Parkinson's disease and other synucleinopathies.

### 4. In vitro Assays:

The monomer is used in high-throughput screening assays to identify potential compounds that could prevent  $\alpha$ -synuclein aggregation or reduce existing aggregates in neurons or other cellular models.

### 5. Biomarker Discovery:

$\alpha$ -Synuclein monomer is studied as a biomarker for neurodegenerative diseases. Its misfolding and aggregation are closely linked to disease onset and progression. By studying its levels, forms, and aggregation state in biological fluids like blood or cerebrospinal fluid (CSF), researchers can develop methods for early diagnosis and monitoring disease progression.

### 6. Protein-Protein Interaction Studies:

Binding and Interaction Studies: The monomeric form of  $\alpha$ -synuclein is used to study its interactions with other proteins and lipids, particularly in relation to synaptic vesicle function. Researchers use surface plasmon resonance (SPR) or isothermal titration calorimetry (ITC) to identify binding partners that influence its function, aggregation, or cellular activity.

### 7. Chaperone Function:

Investigating the interaction of  $\alpha$ -synuclein monomer with molecular chaperones or other cellular proteins can help elucidate its role in protein quality control and cellular stress response mechanisms.

### 8. Vaccine and Immunotherapy Development:

Immunization: Researchers are exploring the use of  $\alpha$ -synuclein monomer in the development of vaccines that aim to trigger an immune response against aggregated  $\alpha$ -synuclein, preventing or clearing toxic aggregates. Immunotherapies targeting  $\alpha$ -

synuclein are under investigation for their potential to reduce or halt the progression of Parkinson's disease.

#### **9. Monoclonal Antibodies:**

The monomer is used to develop monoclonal antibodies that can specifically bind to  $\alpha$ -synuclein aggregates or prevent its aggregation in the brain.

#### **10. Cellular and Structural Biology:**

**Membrane Interaction Studies:** The monomer is used to investigate how  $\alpha$ -synuclein interacts with lipid membranes, which is essential for understanding its role in synaptic vesicle formation and neurotransmitter release. This helps clarify how it influences synaptic activity and its potential to cause neuronal dysfunction.

#### **11. Structural Characterization:**

Structural biologists use  $\alpha$ -synuclein monomer to study its conformational flexibility using techniques such as NMR (nuclear magnetic resonance) or X-ray crystallography. These studies provide insights into the protein's ability to adopt different structures and how its misfolding and aggregation contribute to disease.

#### **12. Gene Therapy and RNA Interference:**

**Gene Silencing:** The monomer form is used in studies that aim to explore RNA interference (RNAi) or CRISPR/Cas9 strategies to reduce or knock out  $\alpha$ -synuclein expression in cells or animal models. This research can help determine if reducing the levels of  $\alpha$ -synuclein can prevent or mitigate neurodegeneration in Parkinson's disease.

## **Reference:**

1. Scott D, Roy S.  $\alpha$ -Synuclein inhibits intersynaptic vesicle mobility and maintains recycling-pool homeostasis. *J Neurosci*. 2012 Jul 25;32(30):10129-35. doi: 10.1523/JNEUROSCI.0535-12.2012. PMID: 22836248; PMCID: PMC3426499.
2. Burré J, Sharma M, Südhof TC.  $\alpha$ -Synuclein assembles into higher-order multimers upon membrane binding to promote SNARE complex formation. *Proc Natl Acad Sci U S A*. 2014 Oct 7;111(40):E4274-83. doi: 10.1073/pnas.1416598111. Epub 2014 Sep 22. PMID: 25246573; PMCID: PMC4210039.
3. Li, B., Ge, P., Murray, K.A. et al. Cryo-EM of full-length  $\alpha$ -synuclein reveals fibril polymorphs with a common structural kernel. *Nat Commun* 9, 3609 (2018). <https://doi.org/10.1038/s41467-018-05971-2>

## **Related products:**

#### **1. Monomer proteins:**

- (1) Human  $\alpha$ -synuclein monomer Protein (Full length, A30P)
- (2) Human  $\alpha$ -synuclein monomer Protein (Full length, E46K)
- (3) Human  $\alpha$ -synuclein monomer Protein (Full length, A53T)
- (4) Human  $\alpha$ -synuclein monomer Protein (Full length, A53E)
- (5) Human  $\alpha$ -synuclein monomer Protein (Full length, G51D)
- (6) Human  $\alpha$ -synuclein monomer Protein (Full length, H50Q)
- (7) Human  $\alpha$ -synuclein monomer Protein (Full length, T72M)

2.  **$\alpha$ -synuclein pre-formed fibrils(PFFs)**

- (1) Human  $\alpha$ -synuclein wild-type full-length pre-formed fibrils(PFFs)
- (2) Human  $\alpha$ -synuclein A30P full-length pre-formed fibrils(PFFs)
- (3) Human  $\alpha$ -synuclein E46K full-length pre-formed fibrils(PFFs)
- (4) Human  $\alpha$ -synuclein A53T full-length pre-formed fibrils(PFFs)
- (5) Human  $\alpha$ -synuclein A53E full-length pre-formed fibrils(PFFs)
- (6) Human  $\alpha$ -synuclein G51D full-length pre-formed fibrils(PFFs)
- (7) Human  $\alpha$ -synuclein H50Q full-length pre-formed fibrils(PFFs)
- (8) Human  $\alpha$ -synuclein T72M full-length pre-formed fibrils(PFFs)

## Disclaimers

*This product is intended for laboratory research use only. It is not intended for any animal or human therapeutic use, any human or animal consumption, or any diagnostic use.*

## Product Promise

*At TriDix Bio, we are dedicated to supporting your work with high quality products. In the unlikely event of one of our products not working as expected, you are covered by our product promise.*