### Introduction:

Two abundant proteins of 140 and 134 amino acids were purified and sequenced from human brain. The 140 amino acid protein was found to be identical with the precursor of the non-Aβ component of Alzheimer's disease amyloid (NACP) which in turn is highly homologous to synuclein previously identified from Torpedo electroplaques and rat brain. The 134 amino acid protein is the human homologue of bovine phosphoneuroprotein 14 (PNP14) and is 61% identical in sequence to the 140 amino acid protein. The previously unrecognised homology between these two proteins defined a family of human brain synucleins. The 140 and 134 amino acid proteins are now referred to as α-synuclein and β-synuclein, respectively. Both synucleins are expressed predominantly in brain, where they are concentrated in presynaptic nerve terminals. It has been suggested that α-synuclein is constitutively phosphorylated within its C-terminal domain and that the function of α-synuclein may be regulated by phosphorylation/dephosphorylation.

In Alzheimer’s disease, α-synuclein/NAC proteins are found in presynaptic cholinergic nerve terminals that degenerate early in Alzheimer’s disease, and they are also found closely linked to β-amyloid fibrils in senile plaques. Synuclein/NAC proteins provide a potential molecular link between the degeneration of cholinergic nerve terminals, and the formation of plaques, and might play a primary role in their development. Lewy bodies and Lewy neurites are the defining neuropathological characteristics of Parkinson’s disease and dementia with Lewy bodies. They are made of abnormal filamentous assemblies of unknown composition. Lewy bodies and Lewy neurites from Parkinson's disease and dementia with Lewy bodies are stained strongly by antibodies directed against α-synuclein. The number of α-synuclein-stained structures exceeds those immunoreactive for ubiquitin, currently the most sensitive marker of Lewy bodies and Lewy neurites. Staining for α-synuclein may thus prove to be the preferred method for detecting Lewy bodies and Lewy neurites. Findings indicate that α-synuclein forms the major filamentous component of Lewy bodies and Lewy neurites.

It has been suggested that α-synuclein lowers the p53-dependent caspase-3 activation of TSM1 neuronal cells in response to apoptotic stimuli and the authors propose that the natural toxin 6-hydroxydopamine abolishes this anti-apoptotic phenotype by triggering α-synuclein aggregation, and that this mechanism could contribute to the neuropathology of Parkinson’s disease.

A recent report has shown that α-synuclein is not ubiquitylated in HEK293 cells, and concludes that the proteasome does not contribute to the control of cellular synuclein concentration.

### Product information:

The rabbit polyclonal antiserum was raised to a synthetic peptide corresponding to residues [Cys] + 117-131 of human α-synuclein conjugated to keyhole limpet haemocyanin using a proprietary technique. The amino acid sequence used is conserved in the rat α-synuclein except for two substitutions, namely Asp → Ser and Asn → Ser. Vial contains an immunoglobulin preparation, purified by caprylic acid and ammonium sulphate precipitation, containing 0.01M sodium azide.

**Application data**

- α-Synuclein; alternative names: non-A beta component of senile plaques, NACP; GDB ref: SNCA; chromosomal locus: 4q21.3-4q22; GenBank accession number: 2136215; length: 140 amino acids; molecular weight: 14460; theoretical pf: 4.67.

**Immunoblotting** - The antibody has been characterised by single dimension SDS-PAGE using recombinant α- and β-synucleins as well as rat, mouse and human brain lysates with and without peptide blockade. Studies with the recombinant proteins demonstrated the absolute specificity of the antibody for α-synuclein. The antibody gives a strong band at a relative molecular weight of approximately 15kDa with human brain lysate which is wholly abolished by preincubation with the immunising peptide (see product number SP 9340). Dilutions in the range 1:1000-1:20000 have been reported.

**Immunoprecipitation** - This antibody has not been characterised for use in immunoprecipitation.

**Immunohistochemistry** - The antibody has been tested on de-waxed tissue sections of human brain fixed in neutral buffered formaldehyde. A standard protocol should be followed.

**Species reactivity**: This antibody has been shown to react strongly with human brain-derived α-synuclein (see below). The antibody also reacts with rat brain-derived α-synuclein but reactivity appears substantially less than with human. SA3400 is not suitable to detect mouse α-synuclein.

---

(a)   (b)   (c)

Luminograph of human brain lysate without (a) and with (b) peptide blockade, and (c) recombinant α-synuclein after PAGE followed by blotting onto PVDF and probing with antibody SA 3400. Antibody dilution 1:5000 using an indirect immunoperoxidase procedure with ECL development (30sec. exposure).

continued
Product Data Sheet

Product name(s): Rabbit polyclonal antibody to α-synuclein

Catalogue number: SA 3400

α-Synuclein in human brain

De-waxed section of human brain temporal cortex showing α-synuclein immunoreactivity in Lewy bodies. Diffuse Lewy body disease. ABC-peroxidase method. Nissl counterstain. Micrograph provided courtesy of Dr J.-P. Brion, Université Libre de Bruxelles, Belgium.

Vial contents, Storage and Use:

Vial contains an immunoglobulin preparation, purified by ligand-affinity chromatography from whole serum, suspended in phosphate-buffered saline (pH 7.4) containing 0.01M sodium azide.

Store unopened vial at -20°C until required for use. AVOID REPEATED FREEZE-THAW CYCLES. Aliquot undiluted antibody into smaller volumes (not less than 10µL) prior to freezing if appropriate. The use of high quality ‘antiserum-grade’ plastic or glass vials is recommended. Store diluted antibody at 2-4°C (do not freeze) and use within 1 month.

Dilute to working strength with 50mM PBS (pH 7.4) containing 1.5% sodium chloride and 1% normal goat serum (if a goat anti-rabbit IgG linker antibody is to be used).

References:


Other citations:


Also available from AFFINITI:

Peptide-derived, isoform-specific rabbit polyclonal antibody to: β-Synuclein (SA 3405)

plus many antibodies for the investigation of neurodegeneration and the most comprehensive range of products for ubiquitin-proteasome pathway research