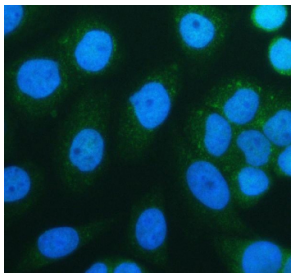
SIRT3 Antibody / Sirtuin 3 (FY13394)

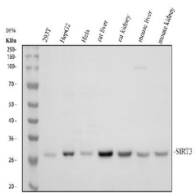
Catalog No.	Formulation	Size
FY13394	Adding 0.2 ml of distilled water will yield a concentration of 500 ug/ml	100 ug

Bulk quote request

Availability	1-2 days
Species Reactivity	Human, Mouse, Rat
Format	Lyophilized
Clonality	Polyclonal (rabbit origin)
Isotype	Rabbit IgG
Purity	Immunogen affinity purified
Buffer	Each vial contains 4 mg Trehalose, 0.9 mg NaCl, 0.2 mg Na2HPO4.
UniProt	Q9NTG7
Localization	Cytoplasm (Mitochondria)
Applications	Western Blot : 0.25-0.5ug/ml Immunofluorescence : 5ug/ml ELISA : 0.1-0.5ug/ml
Limitations	This SIRT3 antibody is available for research use only.



Immunofluorescent staining of FFPE human SiHa cells with SIRT3 antibody (green) and DAPI nuclear stain (blue). HIER: steam section in pH6 citrate buffer for 20 min.



Western blot testing of 1) human 293T, 2) human HepG2, 3) human HeLa, 4) rat liver, 5) rat kidney, 6) mouse liver and 7) mouse kidney lysate with SIRT3 antibody. Although the predicted molecular weight of the SIRT3 precursor is ~44 kDa, all samples display a prominent ~29 kDa band corresponding to the mature, mitochondrially processed form of SIRT3, consistent with known post-translational cleavage of its N-terminal targeting sequence.

Description

SIRT3 antibody detects Sirtuin 3, a mitochondrial NAD-dependent deacetylase that plays a central role in regulating cellular energy metabolism, oxidative stress responses, and mitochondrial protein homeostasis. The UniProt recommended name is NAD-dependent protein deacetylase sirtuin-3 (SIRT3). As a member of the sirtuin family, SIRT3 responds to nutrient availability, stress conditions, and metabolic cues by modifying the acetylation status of key mitochondrial enzymes. This activity influences ATP production, antioxidant defense, fatty acid oxidation, and overall mitochondrial fitness.

SIRT3 antibody identifies a protein synthesized as a long precursor that undergoes proteolytic processing within the mitochondria, yielding an active mature form. Sirtuin 3 resides primarily in the mitochondrial matrix, where it deacetylates numerous targets, including components of the electron transport chain, tricarboxylic acid (TCA) cycle enzymes, and antioxidant regulators such as SOD2. Through these actions, SIRT3 maintains mitochondrial respiration efficiency and protects cells from oxidative damage. Its regulatory role in metabolic adaptation becomes especially important during fasting, caloric restriction, endurance exercise, and other physiological stresses that require energy reallocation and enhanced mitochondrial resilience.

The SIRT3 gene is located on chromosome 11p15.5 and is broadly expressed in tissues with high metabolic demand, including heart, liver, skeletal muscle, brown adipose tissue, and kidney. In hepatocytes, SIRT3 promotes fatty acid oxidation and ketogenesis during fasting. In skeletal muscle, it supports mitochondrial biogenesis and contractile efficiency. Cardiomyocytes rely on SIRT3 to maintain redox balance and prevent oxidative injury, making it essential for cardiac stress adaptation. In brown adipose tissue, SIRT3 participates in thermogenic regulation by modulating mitochondrial uncoupling and lipid catabolism.

Functionally, SIRT3 acts as a metabolic gatekeeper by coordinating mitochondrial output with cellular energy needs. It becomes activated when intracellular NAD levels rise, a condition associated with nutrient scarcity or increased respiration. Activated Sirtuin 3 deacetylates enzymes that enhance oxidative phosphorylation, stabilize mitochondrial DNA integrity, and reduce reactive oxygen species (ROS) production. By regulating mitochondrial permeability transition pore components, SIRT3 also contributes to apoptosis control and cell survival pathways. These interconnected functions position SIRT3 as a central integrator of metabolism, redox balance, and mitochondrial quality control.

Pathologically, dysregulation of SIRT3 expression or activity has been linked to metabolic disorders, neurodegenerative diseases, cardiovascular injury, aging-related decline, and cancer. Reduced SIRT3 levels are associated with obesity-induced metabolic dysfunction, insulin resistance, and hepatic steatosis due to impaired mitochondrial fatty acid oxidation. In neurodegenerative settings, diminished SIRT3 activity contributes to increased oxidative stress vulnerability and mitochondrial damage. Conversely, in cancer, SIRT3 can act as either a tumor suppressor or a facilitator of metabolic reprogramming depending on tissue context. Loss of SIRT3 may lead to elevated ROS and genomic instability, while in some tumors, elevated SIRT3 supports mitochondrial bioenergetic demands that enable rapid proliferation. Its dual nature reflects the complexity of mitochondrial signaling across diverse biological environments.

Within the immune system, SIRT3 influences macrophage activation and inflammatory tone by modulating mitochondrial ROS and metabolic flux. Emerging studies suggest that SIRT3 participates in T-cell memory formation and stress-adaptive immune functions, further underscoring its importance beyond classical bioenergetics. In aging research, SIRT3 has attracted interest due to its association with longevity and resilience to age-related mitochondrial decline. Caloric restriction and exercise-two interventions known to extend healthspan-consistently enhance SIRT3 expression and activity.

Research using SIRT3 antibody supports investigations into mitochondrial metabolism, oxidative stress biology, aging, metabolic disease, and tumor bioenergetics. SIRT3 antibody is validated for use in relevant research applications to detect Sirtuin 3 expression and examine its involvement in mitochondrial regulation and metabolic adaptation. NSJ Bioreagents provides SIRT3 antibody reagents optimized for studies in cell metabolism, redox signaling, mitochondrial

physiology, and disease pathogenesis.

Application Notes

Optimal dilution of the SIRT3 antibody should be determined by the researcher.

Immunogen

A synthetic peptide corresponding to a sequence in the middle region of human SIRT3, which shares 80% amino acid (aa) sequence identity with mouse and rat SIRT3.

Storage

After reconstitution, the SIRT3 antibody can be stored for up to one month at 4oC. For long-term, aliquot and store at -20oC. Avoid repeated freezing and thawing.