

Osteopontin Human HEK293

Product Data Sheet

Type: Recombinant
Source: HEK293
Species: Human
Other names: OPN

Cat. No.:
RD172446100 (0.1 mg)

Description

Total 290 AA. MW: 33.0 kDa (calculated). UniProtKB acc. No. P10451 (Ile17-Asn300). C-terminal His-tag (6 extra AA). Protein identity confirmed by LC-MS/MS.

Introduction to the Molecule

Osteopontin (OPN) also named secreted phosphoprotein-1 (SPP1) and sialoprotein-1, is negatively charged aspartic acid-rich, N-linked glycosylated phosphoprotein composed of 314 amino acid residues. OPN exists in various isoforms as a result of alternative splicing, alternative translation and different posttranslation modifications, which result in different molecular weights ranging from 41 to 75 kDa. OPN has primarily been described as a secreted protein but additional evidence suggested that it can also be found in the cytoplasm and nucleus. This form of intracellular OPN (iOPN) is the result of alternative translation and has biological functions distinct from those of secreted OPN (sOPN). OPN molecule has an arginine-glycine-aspartic acid (RGD) cell binding sequence, a calcium binding site and two heparin binding domains. OPN can be modified by thrombin cleavage which exposes additional cryptic integrin-binding sites. Cells bind OPN via multiple cell surface receptors, including various integrin receptors and CD44. OPN is highly expressed in bone (osteoclasts and osteoblasts) and also secreted by various cell types including macrophages, activated T lymphocytes, endothelial cells, smooth muscle cells, epithelial cells, inner ear, brain, placenta and mammary glands, decidua and kidney. Secreted OPN is found in various biological fluids including blood, milk, urine, cerebrospinal fluid, synovial fluid and seminal fluid. OPN is involved in both physiological and pathophysiological processes in multiple organs and tissues. One major physiological function of sOPN is the control of biomineralization. As a member of SIBLING protein family with overall negative charge, OPN is able to directly bind to specific apatite crystal faces thereby acts as a mineralization inhibitor. OPN is also strongly upregulated at sites of ectopic, pathologic calcification - such as vascular calcification, valvular calcification, renal crystal formation and gallstone formation and prevents or limits calcification. Moreover OPN is required for bone remodeling process and stimulates adhesion, migration and bone resorption by osteoclast. Abundant evidence suggests that OPN plays a critical role in acute inflammation and leukocyte recruitment and in chronic inflammatory diseases such as multiple sclerosis, Crohn's disease and other autoimmune disorders, several types of cancer and cardiovascular diseases. OPN may exert both pro-inflammatory and anti-inflammatory actions depending on biological requirement. Increased OPN levels in cerebrospinal fluid have been found in patients with inflammatory neurological disease (e.g. multiple sclerosis, Alzheimer's disease and neuromyelitis optica) and may reflect disease progression. OPN is a critical regulator of adipose tissue inflammation in obesity. In adipose tissue, OPN is upregulated, induces infiltration and activation of macrophages and these infiltrated macrophages produce proinflammatory cytokines which contribute to adipose tissue insulin resistance and type 2 diabetes. Furthermore, OPN was shown to negatively influence atherosclerosis and hepatic disorders which are strongly associated with obesity and type 2 diabetes such as non-alcoholic fatty liver disease (NAFLD) and diabetic nephropathy. Clinical approaches show that circulating OPN levels in obese patients were elevated compared with lean subjects and were further increased in obese diabetic or insulin resistant patients. OPN is a tumor-associated antigen that is highly expressed in multiple human cancers including lung cancer, breast cancer, melanoma and mesothelioma. The level of circulating OPN may be indicative of cancer progression, metastasis, and prognosis. Recent study shows, that OPN plasma level of metastatic breast cancer patients is significantly higher in comparison with a non-metastatic group, and OPN can be a biochemical marker giving early signal for metastases. Urinary OPN concentration can be used for investigation of renal stone disease because OPN inhibits urinary crystallization. It has been reported that elevated OPN level was presented in plasma and synovial fluid of patients with rheumatoid arthritis (RA) and with osteoarthritis (OA) compared to the control OPN level. Measurements of plasma and synovial fluid levels of OPN in patients with primary knee OA reveal significant correlation with severity of knee pain and radiologic progression of the disease. Effect of OPN for cell survival was demonstrated on epithelial, endothelial and smooth muscle cells. The experiment indicated that the OPN binding to $\alpha v \beta 3$ integrin of endothelial cells activates the pro-survival transcription factor NF κ B and protects cells from undergoing apoptosis. Current clinical investigation of critically ill patients with and without sepsis

described that persistently elevated OPN serum concentrations are associated with unfavorable outcome independent of the presence of sepsis. Studies indicate that OPN may be a prognostic biomarker in these patients during early course of treatment in medical intensive care units.

Research topic

Bone and cartilage metabolism, Cardiovascular disease, Diabetology - Other Relevant Products, Energy metabolism and body weight regulation, Immune Response, Infection and Inflammation, Neural tissue markers, Oncology, Renal disease

Amino Acid Sequence

IPVKQADSGS SEEKQLYNKY PDAVATWLNQ DPSQKQNLLA PQTLPKSKSNE SHDHMDMDD EDDDDHVDSQ DSIDSNDSDD
VDDTDDSHQS DESHHSDESD ELVTDFPTDL PATEVFPTPVV PTVDTYDGRG DSVVYGLRSK SKKFRRPDIQ YPDATDEDIT
SHMESEELNG AYKAIPVAQD LNAPSDWDSR GKDSYETSQ L DDQSAETHSH KQSRLYKRKA NDESNEHSDV IDSQELSKVS
REFHSHEFHSH HEDMLVVDPK SKEEDKHLKF RISHELD SAS SEVN **HHHHHH**

Source

HEK293

Purity

Purity as determined by densitometric image analysis: >95%

SDS-PAGE gel



12 % SDS-PAGE separation of Human Osteopontin (HEK):

1. M.W. marker - 14, 21, 31, 45, 66, 97 kDa
2. Reduced and boiled sample, 2.5 µg/lane
3. Non-reduced and non-boiled sample, 2.5 µg/lane

Endotoxin

< 1.0 EU/µg

Formulation

Filtered (0.4 µm) and lyophilized from 0.5 mg/ml solution in phosphate buffered saline pH7.5 containing 5% (v/v) Trehalose

Reconstitution

Add 200 µl of deionized water to prepare a working stock solution of approximately 0.5 mg/ml and let the lyophilized pellet dissolve completely. Filter sterilize your culture media/working solutions containing this non-sterile product before using in cell culture.

Shipping

At temperature 2 - 8 °C. Upon receipt, store the product at the temperature recommended below.

Storage, Stability/Shelf Life

Store the lyophilized protein at -80 °C. Lyophilized protein remains stable until the expiry date when stored at -80 °C. Aliquot reconstituted protein to avoid repeated freezing/thawing cycles and store at -80 °C for long term storage. Reconstituted protein can be stored at 4 °C for a week.

Quality Control Test

- BCA to determine quantity of the protein.
- SDS-PAGE to determine purity of the protein.
- LAL TEST to determine endotoxin level.

Applications

Cell culture and/or animal studies, ELISA, Western blotting

Note

This product is intended for research use only.

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