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Product Information

Platelet-Derived Growth Factor-AA, human recombinant, expressed in *E. coli*

Catalog Number **P3076**
Storage Temperature –20 °C

Synonym: PDGF-AA

Product Description

Platelet-Derived Growth Factor (PDGF), first identified by Ross et al.[1] in serum, is the principal mitogen present for cells of mesenchymal origin.[2,3] PDGF is localized in α-granules of platelets and released during clot formation.[4] PDGF from human platelets has been purified and described as a cationic glycoprotein (pI 9.5–10.4) having a molecular mass of ~30 kDa and composed of two covalently linked subunits, designated as chains A (16 kDa) and B (14 kDa).[5-8] In platelets, ~70% of the PDGF is present as the AB dimer, with most of the remainder as BB.[9] Purified human PDGF shows substantial size heterogeneity, ranging from 27–31 kDa, probably due to the presence of isoforms, glycosylation processing, aging of the platelets, and partial proteolysis during purification. The A and B chains are 40% homologous in sequence and are encoded by distinctly different genes.[10] Each chain contains 8 cysteine residues, which are involved in intra- and inter-chain disulfide bonds.[11,12] Cleavage of these bonds by reduction causes irreversible loss of biological activity.[8]

PDGF is believed to play an essential role in the cellular response to tissue injury, both as a stimulant of mesodermal cell growth and activity as a chemoattractant to other cells involved in the repair process.[16] In this role, PDGF appears to interact with Transforming Growth Factor-β1 (TGF-β1), which is also released by degranulating platelets at the source of the damaged tissue.[17] The sources of PDGF during wound repair include platelets (predominantly PDGF-AB), smooth muscles (PDGF-A),[18] monocyte-derived macrophages (PDGF-B),[19] and endothelial cells (PDGF- B).[20] PDGF may play a role during normal embryonic development.[14]

Pathologically, PDGF appears to be an initial mediator and a contributing sustaining factor in the development of atherosclerosis.[18-21] Abnormal cellular expression of PDGF is associated with certain malignant transformations.[13]

In fact, a transforming protein ($p28^{sis}$) encoded by the simian sarcoma virus oncogene (*v-cis*) contains a section that is virtually identical to PDGF-B in its amino acid sequence,[23] is processed into a PDGF-BB-like homodimer,[24] and exhibits biological actions identical to PDGF.[25] Detection of *v-cis*-related mRNA (*c-sis* RNA) has been reported in certain malignancies of mesenchymal cell origin, including fibrosarcoma, glioblastoma, and osteosarcoma.[26,27] PDGF-A chain or both A and B chains are expressed by certain other tumor cell lines.[10,28] Other pathological conditions in which PDGF has been implicated include scleroderma, inflammatory joint disease, myelofibrosis, and pulmonary fibrosis.[9,14]

Purified PDGF activates two distinct PDGF receptors encoded by separate genes.[29,30] PDGF-AA binds only to α-PDGF receptor, but PDGF-AB and PDGF-BB bind to both α and β receptors; i.e., the α receptor binds either A or B chain, and the β receptor binds only the B chain.[29,31]

Perhaps the independent expression of specific receptor types and the availability of the different isoforms of PDGF may explain the diverse range of observed cellular PDGF responses.[30] For example, the PDGF-B gene has a much greater transforming potential than the PDGF-A gene when transfected into NIH 3T3 cells, but the PDGF-A gene product is more efficiently secreted into the medium.[32] The sequence domains on each chain responsible for the greater receptor activation and secretory ability have been recently mapped.[33] Furthermore, certain tumors have been found to express the β-PDGF receptor with or without the coexpression of the PDGF-B chain, indicating a tumor may be autocrinically growth stimulated[34] or stimulated by exogenous PDGF.[35] Binding of either PDGF receptor to its substrate induces receptor autophosphorylation at a tyrosine residue,[31] which then becomes detectable by immunoreaction with monoclonal anti-phosphotyrosine.

Recombinant human PDGF-AA is a 28.5 kDa A chain homodimer protein containing 250 amino acid residues. It is sterile filtered through a 0.2 μm filter and lypohilized with 10 mM acetic acid.

The biological activity of PDGF-AA was tested in culture by measuring its ability to stimulate ^{3}H-thymidine incorporation in BALB/c 3T3 cells.

The ED_{50} is defined as the effective concentration of growth factor that elicits a 50% increase in cell growth in a cell based bioassay.

Purity: ≥98% (SDS-PAGE and HPLC)

Endotoxin: <0.1 ng/μg

Precautions and Disclaimer
This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions
Reconstitute the contents of the vial using water to a concentration of 0.1–1.0 mg/ml. This solution can be further diluted into other aqueous buffers and stored at 2–8 °C for up to 1 week or stored at –20 °C for extended use.

Storage/Stability
Prior to reconstitution, store the product at –20 °C. It is stable for up to a few weeks at room temperature.

Reconstituted product should be stored in working aliquots at –20 °C. Repeated freezing and thawing is not recommended. Storage in frost-free freezers is not recommended.

References

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