

Phospholipase A₂ (E.C. 3.1.1.4)

Overview: Phospholipase A₂ (PLA₂) cleaves the *sn*-2 fatty acid of phospholipids, primarily phosphatidylcholine, to generate lysophosphatidylcholine and arachidonic acid. Most commonly used inhibitors (e.g. BEL, ATFMK or MAFP) are either non-selective within the family of phospholipase A₂ enzymes or have activity against other eicosanoid-metabolizing enzymes.

Secreted or extracellular forms

Nomenclature	Other names	Ensembl ID
sPLA ₂ -1B	GIB, pancreatic PLA ₂	ENSG00000170890
sPLA ₂ -2A	GIIA, GIIC sPLA ₂ , non-pancreatic secretory phospholipase A ₂ , NPS-PLA ₂ , synovial PLA ₂	ENSG00000188257
sPLA ₂ -2D	GIID, GIID sPLA ₂ , secretory-type PLA ₂ , stroma-associated homologue	ENSG00000117215
sPLA ₂ -2E	GIIE, GIIE sPLA ₂	ENSG00000188784
sPLA ₂ -2F	GIIF, GIIF sPLA ₂	ENSG00000158786
sPLA ₂ -3	GIIL, GIIL sPLA ₂	ENSG00000100078
sPLA ₂ -10	GX, GX sPLA ₂	ENSG00000069764
sPLA ₂ -12A	GXIIA, GXII sPLA ₂	ENSG00000123739

PLA₂-2C (ENSG00000187980) may be a pseudogene, while PLA₂-12B (GXIIIB, GXIII sPLA₂-like, ENSG00000138308) appears to be catalytically inactive (Rouault *et al.*, 2003). A further fragment has been identified with sequence similarities to Group II PLA₂ members (ENSG00000187980).

A binding protein for secretory phospholipase A₂ has been identified (ENSG00000153246), which shows modest selectivity for sPLA₂-1B over sPLA₂-2A, and also binds snake toxin phospholipase A₂ (Ancian *et al.*, 1995). The binding protein appears to have clearance function for circulating secretory phospholipase A₂, as well as signalling functions, and is a candidate antigen for idiopathic membranous nephropathy (Beck *et al.*, 2009).

Cytosolic, calcium-dependent forms

Nomenclature	Other names	Ensembl ID
cPLA ₂ -4A	GIVA, Calcium-dependent PLA ₂ , cytosolic phospholipase A ₂ α	ENSG00000116711
cPLA ₂ -4B	GIVB, cytosolic phospholipase A ₂ β	ENSG00000168970
cPLA ₂ -4C	GIVC, cytosolic phospholipase A ₂ γ	ENSG00000105499
cPLA ₂ -4D	GIVD, cytosolic phospholipase A ₂ δ	ENSG00000159337
cPLA ₂ -4E	GIVE, cytosolic phospholipase A ₂ ε	ENSG00000188089
cPLA ₂ -4F	GIVF, cytosolic phospholipase A ₂ ζ	ENSG00000168907

cPLA₂-4A also expresses lysophospholipase (EC 3.1.1.5) activity (Sharp *et al.*, 1994).

Other forms

Nomenclature	Other names	Ensembl ID
PLA ₂ -G5	GV, PLA ₂ -10	ENSG00000127472
iPLA ₂ -G6	GVI, 85 kDa Ca ²⁺ -independent, iPLA ₂ , PNPLA9	ENSG00000184381
PLA ₂ -G7	GVII, LDL-associated phospholipase A ₂	ENSG00000146070

PLA₂-G7 and a close homologue (HSD-PLA₂, also known as serine-dependent phospholipase A₂, PAFAH2, ENSG00000158006) also express platelet-activating factor acetylhydrolase activity (EC 3.1.1.47). Otoconin 90 (OC90, ENSG00000132297) shows sequence homology to PLA₂-G10.

Abbreviations: ATFMK, arachidonoyltrifluoromethylketone; BEL, bromoenolactone; MAFP, methylarachidonoyltrifluorophosphonate

Further Reading

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References

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Rouault M *et al.*(2003). *Biochemistry* **42**: 11494–11503.
Sharp JD *et al.*(1994). *J Biol Chem* **269**: 23250–23254.