Oseltamivir Phosphate
PRODUCT DATA SHEET

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Product Name:	Oseltamivir Phosphate
Product Number:	O041
CAS Number:	204255-11-8
Molecular Formula:	$C_{16}H_{28}N_2O_4 \cdot H_3PO_4$
Molecular Weight:	410.40
Form:	Powder
Appearance:	White to off-white powder
Solubility:	Slighly soluble in DMSO. Sparingly soluble in water.
Source:	Synthetic
Storage Conditions:	-20°C
Description:	Oseltamivir Phosphate is an inhibitor of influenza viral neuraminidase. It is also an antiviral used against influenza A and B. Oseltamivir was discovered at Gilead in 1997 using shikimic acid as a starting point for synthesis. The compound has promising anti-cancer activity. Oseltamivir Phosphate is slightly soluble in DMSO but sparingly soluble in water.
Mechanism of Action:	Oseltamivir Phosphate is converted to its active form (Oseltamivir Carboxylate) *in vivo* by hepatic esterases via ester hydrolysis. Oseltamivir Carboxylate inhibits influenza viral neuraminidase (syn: sialidase) , an enzyme which cleaves sialic acid residues. The residues are found on glycoproteins on the cell surface of human cells that help new virions exit the cell. The result is that the newly replicated virus cannot be released from infected cells of the respiratory tract and thus cannot replicate.
Spectrum:	Oseltamivir has broad-spectrum activity against a range of influenza A and B subtypes, due to the conserved nature of the neuraminidase enzyme, which is highly selective for influenza only (neuraminidase A and B). It is effective for human seasonal viruses, avian viruses, and pandemic viruses including H1N1 virus.
Microbiology Applications	Oseltamivir Phosphate IC_{50} range for influenza A and B subtypes is ≤ 1 nM - 30 nM. Resistance to Oseltamivir is due to single amino acid residue substitutions (His274Tyr in N1) in the neuraminidase enzyme.

Cancer Applications

The antitumor activity of Oseltamivir Phosphate was studied in a mouse model with human triple-negative breast adenocarcinoma using MCF-7 and MDA-MB-231 cell lines. The compound was able to completely ablate tumor vascularization, tumor growth, and metastasis when used at 50 mg/kg (Haxho et al, 2014).

The anti-cancer properties of Oseltamivir Phosphate was studied in human pancreatic cancer (PANC1) cells with acquired resistance to cisplatin and gemcitabine. Authors found it was efficacious in overcoming the intrinsic resistance of the cell to chemotherapeutics and metastasis. Targeting the Neu 1 sialidase enzyme with Oseltamivir Phosphate at the growth factor receptor level disables the signaling platform for cancer cells. It was able to reverse epithelial-mesenchymal transition (EMT), as demonstrated by the expression of N-cadherin, VE-cadherin and E-cadherin as characteristic markers of EMT, which is the suggested mechanism by which cancer cells acquire resistance to chemotherapy (O'Shea et al, 2014).

References:

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