

## PRODUCT DATA SHEET

### Eicosatetraenoic acid (all *cis*-5,8,11,14)

**Catalog number:** 1042

**Common Name:** Arachidonic acid (all *cis*-5,8,11,14); C<sub>20</sub>:4 (all *cis*-5,8,11,14) Fatty acid

**Source:** natural, fungal

**Solubility:** ethyl ether, hexane, methylene chloride

**CAS number:** 506-32-1

**Molecular Formula:** C<sub>20</sub>H<sub>32</sub>O<sub>2</sub>

**Molecular Weight:** 304

**Storage:** -20°C

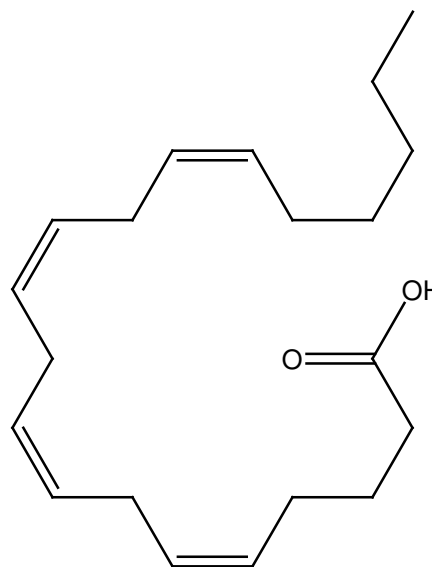
**Purity:** TLC: 99%, GC >99%

**TLC System:** hexane/ethyl ether/acetic acid (80:20:1 by vol.)

**Appearance:** liquid

### **Application Notes:**

Arachidonic acid, an *omega*-6 fatty acid, is an essential fatty acid for most mammals and has many important biological functions in signaling, inflammation, nervous system functions and other processes. It is usually most abundant as a membrane lipid where it is esterified mainly at the sn2 position of phospholipids. It mediates numerous actions that range from induction of cell death to promotion of cell survival and enhancement of neurite extension. Some of arachidonic acids functions include modulation of the activities of protein kinases and ion channels, inhibition of neurotransmitter uptake, enhancement of synaptic transmission, and induction of cellular adhesion.<sup>1</sup> Arachidonic acid has been suggested to be a critical mediator in amyloid-*beta* induced pathogenesis, leading to learning, memory, and behavioral impairments in Alzheimer's disease.<sup>2</sup> In the CNS it plays a fast messenger role in synaptic modulation. An imbalance in n-6 fatty acid and n-3 fatty acid dietary intake has been suggested as the reason for several diseases, including inflammatory and autoimmune diseases, and has recently been blamed predominantly on arachidonic acid because it is a precursor for eicosanoids which have pro-inflammatory and immuno-regulatory activity.<sup>3</sup> Arachidonic acid is also a precursor for autacoids and prostaglandins in mammals. It has been shown to trigger calcium signals in endothelial cells derived from human breast carcinoma but not from healthy cells. This has caused it to be considered a component of the tumor microenvironment although some results suggest that release of arachidonic acid from membrane lipids may help to prevent tumors.<sup>4</sup>



### **Selected References:**

1. H. Katsuki and S. Okuda "Arachidonic acid as a neurotoxic and neurotrophic substance" *Prog Neurobiol*, vol. 46(6) pp. 607-636, 1995
2. R. Sanchez-Mejia and L. Mucke "Phospholipase A2 and arachidonic acid in Alzheimer's disease" *Biochim Biophys Acta*, vol. 1801(8) pp. 784-790, 2010
3. E. Bates "Eicosanoids, fatty acids and neutrophils: their relevance to the pathophysiology of disease" *Prostaglandins Leukot Essent Fatty Acids*, vol. 53 pp.75-86, 1995
4. L. Levine "Proteasome inhibitors: Their effects on arachidonic acid release from cells in culture and arachidonic acid metabolism in rat liver cells" *BMC Pharmacology*, vol. 4(15), 2004

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