



Product Information

L-Arginine

Product Number **A 5006**
Store at Room Temperature

Product Description

Molecular Formula: $C_6H_{14}N_4O_2$

Molecular Weight: 174.2

CAS Number: 74-79-3

pI: 10.76¹

pK_a: 1.82 (COOH), 8.99 (α -NH₂), 12.48 (guanido group)¹

Specific Rotation: 26.9 (16.5 mg/ml, 6.0 N HCl, 20 °C)²

Synonyms: (S)-2-amino-5-guanidinopentanoic acid, S(+)-2-amino-5-[(aminoiminomethyl)amino]pentanoic acid, 2-amino-5-guanidinovaleric acid²

L-Arginine is one of the three amino acids with basic side chains, and is very hydrophilic in character. It contains a guanidino group in the side chain, and this moiety is protonated at physiological pH. Arginine is biosynthesized in the kidneys from citrulline, whose precursor is glutamate via the formation of ornithine. In amino acid degradation *in vivo*, arginine is hydrolyzed to urea and ornithine by arginase. Arginine can be metabolized to glutamate, which in turn is converted to α -ketoglutarate for entry into the citric acid cycle.^{3,4}

L-Arginine is used in cell culture as a component of MEM amino acids solution (Product No. M 5550). Cells utilize L-arginine as a precursor for the production of nitric oxide (NO), which is an activator of guanylyl cyclase and leads to the production of the second messenger cGMP.⁴ The production of NO from cultured porcine aortic endothelial cells has been demonstrated.⁵

Virulence gene expression in a tRNA modification-deficient mutant of *Shigella flexneri* has been modulated by the addition of L-arginine.⁶ A study of the effects of L-arginine on cultured human osteoblasts has been reported, with relation to bone metabolism and growth.⁷ An investigation of varying the environment for growth of *Escherichia coli* between growth in the presence of excess nitrogen (ammonia) to nitrogen starvation, where L-arginine is used as an alternate nitrogen source, has been reported.⁸

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is soluble in water (50 mg/ml), yielding a clear, colorless solution.

Storage/Stability

Solutions of L-arginine may be autoclaved. Aqueous solutions of this product are strongly alkaline and tend to absorb carbon dioxide from the atmosphere on standing.²

References

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3. Biochemistry, 3rd ed., Stryer, L., W. H. Freeman (New York, NY: 1988), pp. 20, 500, 501, 505.
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5. Palmer, R. M., et al., Vascular endothelial cells synthesize nitric oxide from L-arginine. *Nature*, **333(6174)**, 664-666 (1988).
6. Durand, J. M., and Bjork, G. R., Putrescine or a combination of methionine and arginine restores virulence gene expression in a tRNA modification-deficient mutant of *Shigella flexneri*: a possible role in adaptation of virulence. *Mol. Microbiol.*, **47(2)**, 519-527 (2003).
7. Torricelli, P., et al., L-arginine and L-lysine stimulation on cultured human osteoblasts. *Biomed. Pharmacother.*, **56(10)**, 492-497 (2002).
8. Atkinson, M. R., et al., Activation of the *glnA*, *glnK*, and *nac* promoters as *Escherichia coli* undergoes the transition from nitrogen excess growth to nitrogen starvation. *J. Bacteriol.*, **184(19)**, 5358-5363 (2002).

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