Product Data Sheet

Product Name: 3-Guanidinopropionic Acid
Cat. No.: GC13992

Chemical Properties

Cas. No.	353-09-3		
Chemical Name	N-(aminoiminomethyl)-β-alanine		
SMILES	NC(NCCC(O)=O)=N		
Formula	$C_4H_9N_3O_2$	M.Wt	131.1
Solubility	≥ 13.1mg/mL in Water	Storage	Store at -20°C
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		
Structure	3-Guanidinopropionic Acid		

Background

3-Guanidinopropionic Acid is an AMP-activated protein kinase (AMPK) stimulator and PPARγ coactivator 1α (PGC-1α) activator.

AMP-activated protein kinase is an enzyme involved in cellular energy homeostasis. AMPK activation has been involved in stimulation of hepatic fatty acid oxidation, ketogenesis, skeletal muscle fatty acid oxidation and glucose uptake, inhibition of cholesterol synthesis, lipogenesis, and triglyceride synthesis, inhibition of adipocyte lipolysis and lipogenesis, and modulation of insulin secretion by pancreatic beta-cells [1]. PGC-1α is a transcriptional coactivator involved in regulating the genes implicated in energy metabolism and mitochondrial biogenesis, such as the the expression of AMPK, genes for oxidative phosphorylation, electron transport chain, and mitochondrial biogenesis, increasing oxidative muscle fibers, numbers of mitochondria, and motor performance [2].

3-Guanidinopropionic acid improved insulin sensitivity and promoted weight loss

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selectively from adipose tissue in animal models of non-insulin-dependent diabetes mellitus (NIDDM). 3-Guanidinopropionic acid was a substrate for both the creatine transporter and creatine kinase [3]. In KKAy mice with noninsulin-dependent diabetes, 3-guanidinopropionic acid decreased the plasma glucose level. In insulin-resistant rhesus monkeys, 3-guanidinopropionic acid increased the disappearance of i.v. glucose [4].

References:

[1] Winder W W, Hardie D G. AMP-activated protein kinase, a metabolic master switch: possible roles in type 2 diabetes[J]. American Journal of Physiology-Endocrinology And Metabolism, 1999, 277(1): E1-E10.
[2] Chaturvedi, R. K.,Adhihetty, P.,Shukla, S., et al. Impaired PGC-1α function in muscle in Huntington’s disease. Human Molecular Genetics 18(16), 3048-3065 (2009).
[3] Larsen S D, Connell M A, Cudahy M M, et al. Synthesis and biological activity of analogues of the antidiabetic/antiobesity agent 3-guanidinopropionic acid: discovery of a novel aminoguanidinoacetic acid antidiabetic agent[J]. Journal of medicinal chemistry, 2001, 44(8): 1217-1230.
[4] Meglasson M D, Wilson J M, Yu J H, et al. Antihyperglycemic action of guanidinoalkanoic acids: 3-guanidinopropionic acid ameliorates hyperglycemia in diabetic KKAy and C57BL6Job/ob mice and increases glucose disappearance in rhesus monkeys[J]. Journal of Pharmacology and Experimental Therapeutics, 1993, 266(3): 1454-1462.

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