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Product Information

3-Guanidinopropionic acid

Product Number **G 6878**

Storage Temperature -0 °C

Replacement for Product Code 39,030-5

Product Description

Molecular Formula: C₄H₉N₃O₂

Molecular Weight: 131.1

CAS Number: 353-09-3

Melting Point: 217-218 °C¹

Synonym: GPA

GPA is a physiological constituent of mammalian blood plasma, erythrocytes, brain, liver, kidney, aorta, and urine. GPA may be formed by L-arginine:glycine amidinotransferase through transamidation between arginine and β-alanine.

This product is one of the more commonly used creatine analogs. It has been shown to competitively inhibit creatine transport across the plasmalemma.² When fed to rats and mice, GPA was shown to cause the concentrations of creatine and phosphocreatine in heart and skeletal muscle to progressively decrease over time.³ In addition to inhibiting creatine uptake, GPA and other creatine analogs appear to be transported themselves by the creatine transporter.⁴ Uptake was shown to be inhibited most efficiently and in a competitive manner by GPA (K_i = 8.8-120 μM). Furthermore, in animals fed GPA, cyclocreatine, or homocyclocreatine, the accumulation of these creatine analogs within the tissues is paralleled by a decline in intracellular creatine and phosphocreatine concentrations.^{5,6} Administration of GPA and other creatine analogs has, therefore, been used widely as an experimental means of depleting tissue creatine and phosphocreatine *in vivo*, with the final goal to unravel the physiological functions of the creatine kinase system.

This product has been demonstrated to improve insulin sensitivity and to promote weight loss selectively from adipose tissue in animal models of non-insulin-dependent diabetes mellitus (NIDDM).⁷ Modifications such as α-alkylation, homologation, and bioisosteric replacement of the aminoguanidine were shown to be detrimental to antidiabetic activity. In fact, treatment of animals with GPA has not only been shown to significantly lower body weight, but also retards growth relative to normal controls.⁸ GPA will even cause young animals to stop eating and often die.⁹

Nevertheless, GPA feeding of rats causes an increase in the mass of brown adipose tissue as well as in DNA, glycogen, and total protein content in this tissue. At the same time, there is an impairment in thermogenic activity in the brown adipose tissue, leading to hypothermia.¹⁰

This product has also been shown to inhibit replication of several viruses including human and simian cytomegaloviruses and varicella zoster virus,¹¹ to protect neurons from 3-NP toxicity disease,¹² and reduce tumor size.¹³ A recent article reviews the potential uses of creatine analogs.¹⁴

Precautions and Disclaimer

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

Preparation Instructions

This product is soluble in water (100 mg/ml).

References

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