



# LKT Laboratories, Inc.

## Metformin Hydrochloride

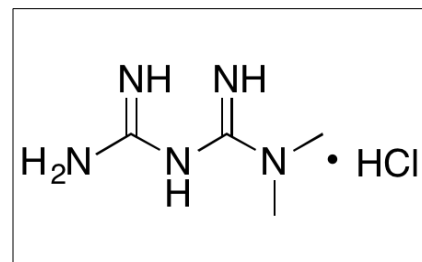
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### Product Information

**Product ID** M2076  
**CAS No.** 1115-70-4  
**Chemical Name** 1,1-Dimethylbiguanide Hydrochloride

**Synonym** Dimethylbiguanide hydrochloride, Imidodicarbonimidic diamide, N,N-dimethyl-, monohydrochloride, N,N-Dimethylbiguanide hydrochloride

**Formula**  $C_4H_{11}N_5 \cdot HCl$   
**Formula Wt.** 165.62  
**Melting Point** 223-226  
**Purity**  $\geq 98\%$   
**Solubility** 100 mM water, 50 mM DMSO



### Pricing and Availability

**Bulk quantities available upon request**

| Product ID | Size  | List Price |
|------------|-------|------------|
| M2076      | 5 g   | \$31.00    |
| M2076      | 25 g  | \$55.80    |
| M2076      | 100 g | \$154.90   |

**Store Temp** Ambient

**Ship Temp** Ambient

**Description** Metformin is an AMPK activator that exhibits anti-diabetic, antihyperglycemic, antioxidative, immunosuppressive, anticancer chemotherapeutic, anti-metastatic, and chemopreventive activities. Metformin modulates glucose-6-phosphatase activity, decreasing glucose production and glycogenolysis. Additionally, it inhibits expression of TNF- $\alpha$  in the liver, reversing pathology of fatty liver disease in vivo. In podocytes, metformin decreases activity of NADPH oxidase and generation of free radicals. In other in vitro models, metformin inhibits expression of MHC molecules and co-stimulatory factors on dendritic cells, preventing antigen presentation. Across several hepatocellular carcinoma cell lines, metformin decreases expression of cyclin D1, cyclin E, and CDK4, inducing G0/G1 phase cell cycle arrest and inhibiting cell proliferation. In vivo, this compound also downregulates expression of c-myc, preventing neoplasia initiation in prostate cancer models. Metformin's activation of AMPK also inhibits Shh signaling in breast cancer models, suppressing proliferation, migration, and invasion. TEST!!!!!!

**References** Fan C, Wang Y, Liu Z, et al. Metformin exerts anticancer effects through the inhibition of the Sonic hedgehog signaling pathway in breast cancer. *Int J Mol Med*. 2015 May 21. [Epub ahead of print]. PMID: 25999130.

Miyoshi H, Kato K, Iwama H, et al. Effect of the anti-diabetic drug metformin in hepatocellular carcinoma in vitro and in vivo. *Int J Oncol*. 2013 Dec 30. [Epub ahead of print]. PMID: 24378856.

Piwkowska A, Rogacka D, Jankowski M, et al. Metformin reduces NAD(P)H oxidase activity in mouse cultured podocytes through purinergic dependent mechanism by increasing extracellular ATP concentration. *Acta Biochim Pol*. 2013;60(4):607-12. PMID: 24432311.

Akinyeke T, Matsumura S, Wang X, et al. Metformin targets c-MYC oncogene to prevent prostate cancer. *Carcinogenesis*. 2013 Dec;34(12):2823-32. PMID: 24130167.

Zhang Y, Guan M, Zheng Z, et al. Effects of metformin on CD133+ colorectal cancer cells in diabetic patients. *PLoS One*. 2013 Nov 21;8(11):e81264. PMID: 24278407.

Shin S, Hyun B, Lee A, et al. Metformin Suppresses MHC-Restricted Antigen Presentation by Inhibiting Co-Stimulatory Factors and MHC Molecules in APCs. *Biomol Ther (Seoul)*. 2013 Jan;21(1):35-41. PMID: 24009856.

Chu CA, Wiernsperger N, Muscato N, et al. The acute effect of metformin on glucose production in the conscious dog is

**Caution:** This product is intended for laboratory and research use only. It is not for human or drug use.