

# Certificate of Analysis

[www.tocris.com](http://www.tocris.com)

**Product Name:** Metformin hydrochloride

**Catalog No.:** 2864

**Batch No.:** 5

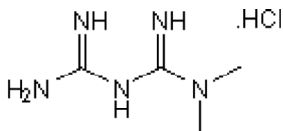
CAS Number: 1115-70-4

EC Number: 214-230-6

IUPAC Name: *N,N*-Dimethylimidodicarbonimidic diamide hydrochloride

## 1. PHYSICAL AND CHEMICAL PROPERTIES

**Batch Molecular Formula:** C<sub>4</sub>H<sub>11</sub>N<sub>5</sub>.HCl  
**Batch Molecular Weight:** 165.62  
**Physical Appearance:** White solid  
**Solubility:** water to 100 mM  
DMSO to 20 mM with gentle warming  
**Storage:** Store at RT  
**Batch Molecular Structure:**



## 2. ANALYTICAL DATA

**<sup>1</sup>H NMR:** Consistent with structure

**Mass Spectrum:** Consistent with structure

**Microanalysis:**

	Carbon	Hydrogen	Nitrogen	Chlorine
Theoretical	29.01	7.3	42.28	21.4
Found	28.61	7.34	43.07	21.1

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

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## Product Information

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CAS Number: 1115-70-4

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### Description:

Metformin hydrochloride is an antidiabetic agent; lowers plasma glucose levels and improves insulin sensitivity. Inhibits hepatic gluconeogenesis via activation of the LKB1/AMPK pathway. Displays antiproliferative effects in cancer cell lines via inhibition of mitochondrial complex I (MRC-1). Activates the aPKC-CBP pathway in neural precursors to promote neurogenesis. Activates autophagy. Identified by chemoinformatics as targeting human host proteins that interact with SARS-CoV-2. Metformin hydrochloride prevents brain atrophy, and slows the pace of aging across diverse tissues in animal studies.

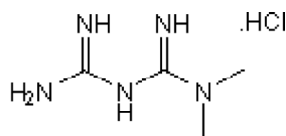
### Physical and Chemical Properties:

Batch Molecular Formula: C<sub>4</sub>H<sub>11</sub>N<sub>5</sub>.HCl

Batch Molecular Weight: 165.62

Physical Appearance: White solid

### Batch Molecular Structure:



**Storage:** Store at RT

### Solubility & Usage Info:

water to 100 mM

DMSO to 20 mM with gentle warming

### Stability and Solubility Advice:

Some solutions can be difficult to obtain and can be encouraged by rapid stirring, sonication or gentle warming (in a 45-60°C water bath).

Information concerning product stability, particularly in solution, has rarely been reported and in most cases we can only offer a general guide. \*Unless contradicted by product-specific protocols or instructions, our standard recommendations apply:

**SOLIDS:** Provided storage is as stated on the product label and the vial is kept tightly sealed, the product can be stored for up to 6 months from date of receipt.

**SOLUTIONS:** We recommend that stock solutions, once prepared, are stored aliquoted in tightly sealed vials at -20°C or below and used within 1 month. Wherever possible solutions should be made up and used on the same day.

### References:

**Yang *et al*** (2024) Metformin decelerates aging clock in male monkeys. *Cell* **187** 1. PMID: 39270656.

**Gordon *et al*** (2020) A SARS-CoV-2-human protein-protein interaction map reveals drug targets and potential drug-repurposing. *Nature* **583**. PMID: 32353859.

**Galluzzi *et al*** (2017) Pharmacological modulation of autophagy: therapeutic potential and persisting obstacles. *Nat.Rev.Drug.Discov.* PMID: 28529316 .

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