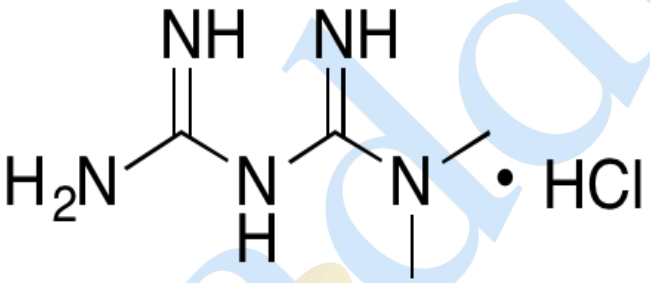
Metformin

M420625

Metformin Hydrochloride (Aladdin M420625 10mM in DMSO) has been widely utilized for decades as an antidiabetic agent, primarily prescribed for the management of type 2 diabetes mellitus. Its primary therapeutic role is to lower blood glucose levels, although the precise molecular mechanism remains incompletely defined. Current evidence indicates that metformin reduces hepatic glucose production by inhibiting mitochondrial respiration and activating AMP-activated protein kinase (AMPK). Additionally, it enhances peripheral glucose uptake and improves insulin sensitivity.

Beyond its well-established antidiabetic use, metformin has recently gained renewed attention for its potential in oncology and aging research. Metformin demonstrates anticancer activity in both cellular and animal systems. It has been shown to suppress tumor growth, metastasis, and tumor initiation, effects largely attributed to its capacity to inhibit mitochondrial oxidative phosphorylation. In primary ovarian cancer cells, metformin triggers cell cycle arrest and apoptosis. Studies in cholangiocarcinoma models report that metformin restricts cell cycle progression, blocks proliferation, and reduces xenograft tumor growth. Clinical data from breast cancer patients further suggest an association between metformin use and reduced mortality.



Metformin Hydrochloride

Recent findings also highlight metformin's influence on aging. In *Drosophila* intestinal stem cells, metformin suppresses age- and oxidative stress–induced centrosome amplification, thereby delaying stem cell aging. By targeting mitochondrial complex I, the compound alters free radical production, which may contribute to its protective effects. In *Caenorhabditis elegans*, metformin treatment extends lifespan by promoting mitohormesis. Additional studies connect metformin's impact on insulin signaling and caloric restriction—both well-known lifespan-extending mechanisms—to longevity benefits.

References:

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