



# Novel small molecule inhibitor to target metabolic plasticity

**A novel pharmaceutical candidate with potent MPC and MCT1 inhibition.**

**IP Status:** US Patent Pending; Application No. 18/846,873

## Applications

- Treatment of MCT-related diseases and conditions (cancer, non-alcoholic steatohepatitis, diabetes, obesity, etc.)

## Key Benefits & Differentiators

- **Dual inhibition:** Targets both MPC and MCT1
- **Broad application:** Potential to be useful for the treatment of multiple diseases

## Technology Overview

Fast-growing cancers require increased bioenergy production. Metabolic plasticity enables cells to switch between glycolysis and oxidative phosphorylation to sustain this energy requirement. Mitochondrial pyruvate carrier (MPC) and monocarboxylate transporter 1 (MCT1) play critical roles in sustaining this plasticity, especially during tumorigenesis and metastasis. MPC is responsible for transporting pyruvate into the mitochondria, while MCT1 is involved in the transport of lactate and pyruvate across cellular membranes. Their role in cancer energetics makes them ideal pharmacological targets.

Researchers at the University of Minnesota have developed a novel compound MN-D7.Tris that has excellent pharmacological and pharmaceutical properties and is suitable for clinical translation. For example, MN-D7.Tris is highly potent in low nM for mitochondrial pyruvate inhibition, water soluble (> 10 mg/ml in water), metabolically stable (~ 4 hrs) in mice, 100% orally bioavailable in mice, well tolerated in mice and suppressed Triple Negative Breast Cancer tumor growth efficiently (~ 79%) as a single agent. The dual inhibition of MPC and MCT by this compound disrupts both mitochondrial energy production and the transport of key metabolic intermediates, offering significant therapeutic potential for the treatment of diseases such as cancer and metabolic disorders.

## Phase of Development

**TRL: 3-4**

In vitro and in vivo data data collected.

## Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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## Technology ID

2022-152

## Category

Life Sciences/Biochemicals & Small Molecules

Life Sciences/Human Health

Life Sciences/Pharmaceuticals

Life Sciences/Therapeutics

## Learn more



## Researchers

- [Venkatram Mereddy, PhD](#) Professor, Department of Pharmacy Practice and Pharmaceutical Sciences

## References

1. Tanner J. Schumacher, Zachary S. Gardner, Jon Rumbley, Conor T. Ronayne, Venkatram R. Mereddy(2024) , <https://www.biorxiv.org/content/10.1101/2024.05.22.595353v1>, bioRxiv