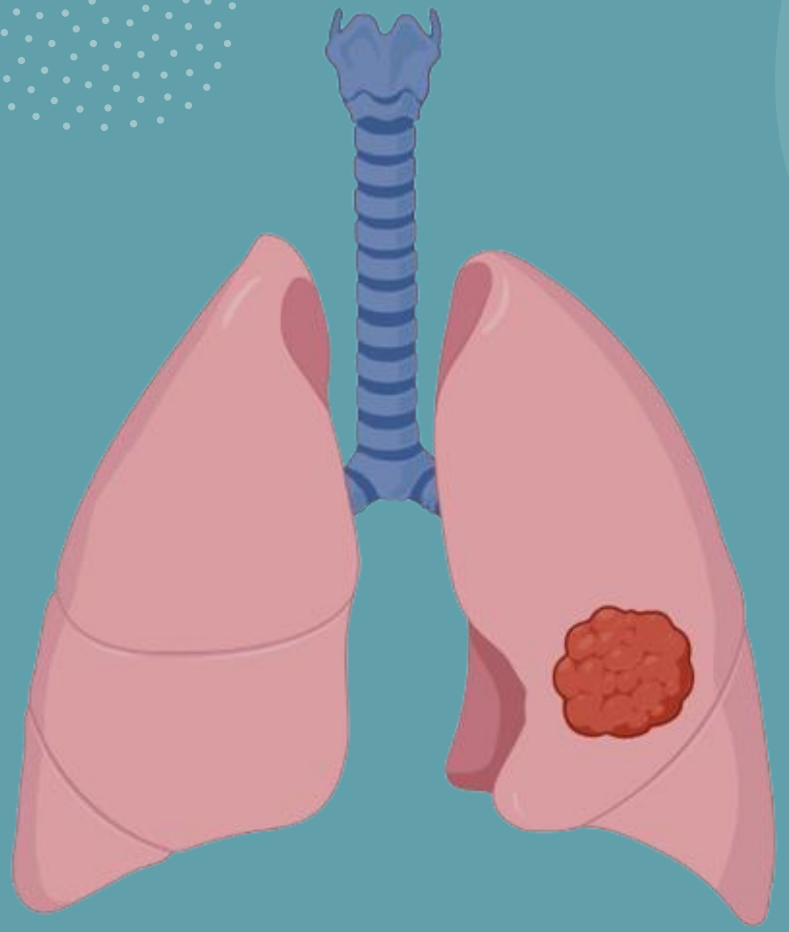
Can the Antidiabetic Drug Phenformin Slow Tumor Growth in Non-Small Cell Lung Cancer?

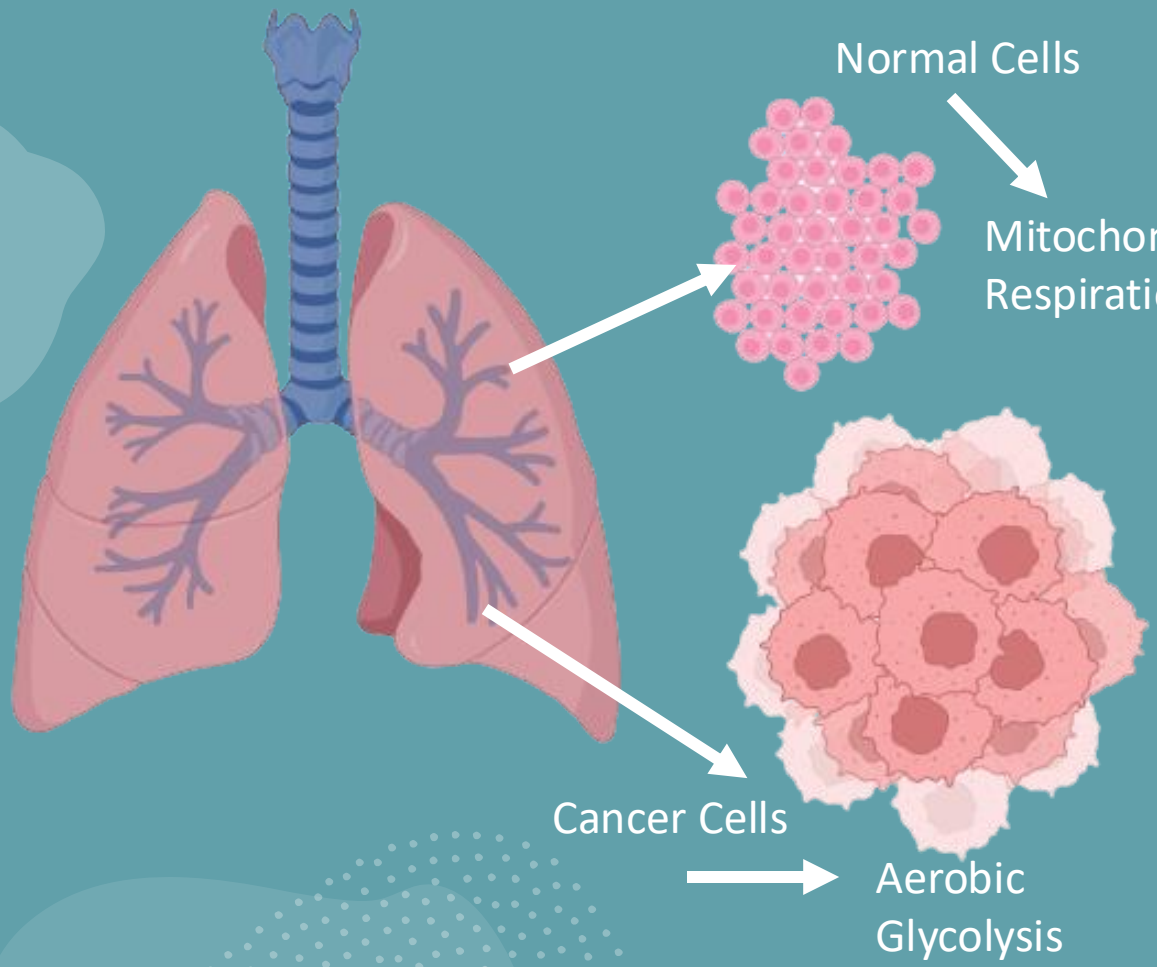
Background

Lung Cancer

- 18% of cancer related death in 2020
- Late diagnosis due to late clinical symptom presentation
- Often developing resistance to treatment



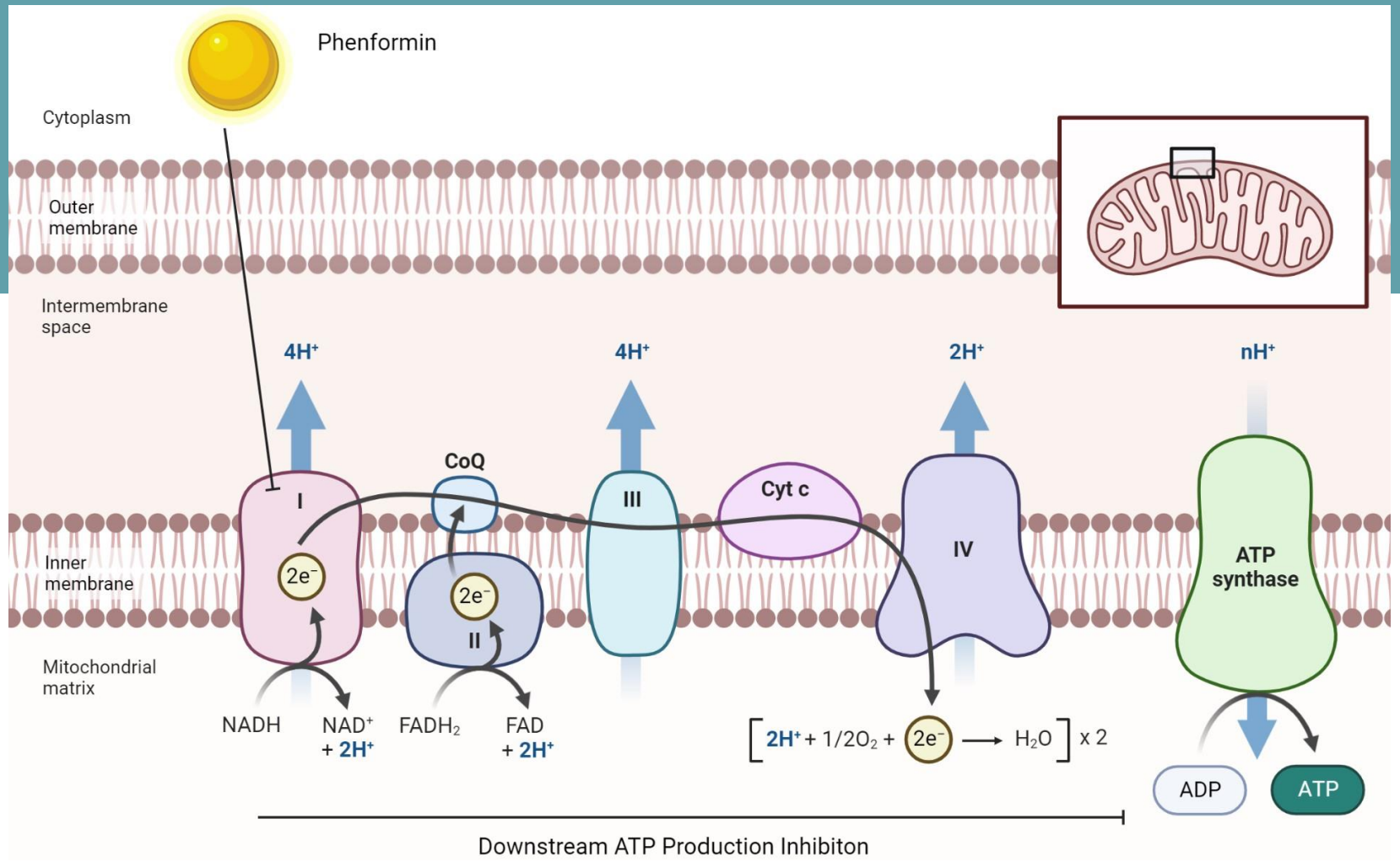
The Warburg Effect



- Cancer cells shift to aerobic glycolysis despite the presence of oxygen
- Counter-intuitive
- Contradicting evidence

Rao S, Mondragon L, Pranjic B, Hanada T, Stoll G, Kocher T, et al. AIF-Regulated Oxidative Phosphorylation Supports Lung Cancer Development. Cell Research. 2018;29:579-91.

Phenformin



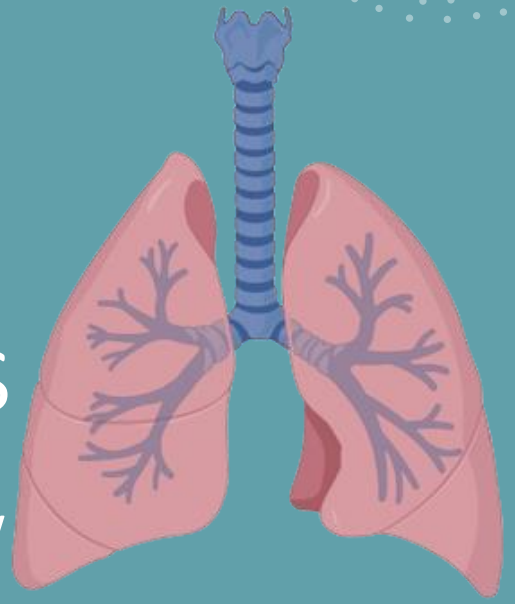
- Inhibition of oxidative phosphorylation
- Leads to activation of AMPK which inhibits mTOR

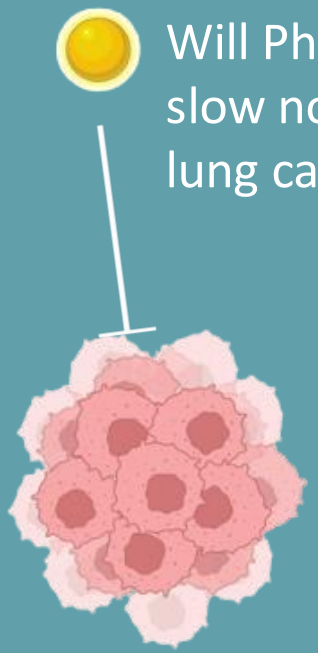
1. Rao S, Mondragon L, Pranjic B, Hanada T, Stoll G, Kocher T, et al. AIF-Regulated Oxidative Phosphorylation Supports Lung Cancer Development. Cell Research. 2018;29:579-91.

2. Masoud R, Reyes-Castellanos G, Lac S, Garcia J, Dou S, Shintu L, et al. Targeting Mitochondrial Complex I Overcomes Chemoresistance in High OXPHOS Pancreatic Cancer. Cell Reports Medicine. 2020;8.

Aim and Hypothesis

- We aim to determine if Phenformin can slow tumorigenesis in non-small cell lung cancer
- We hypothesize that it will, based on evidence from *Rao et. al.* and *Masoud et. al.*



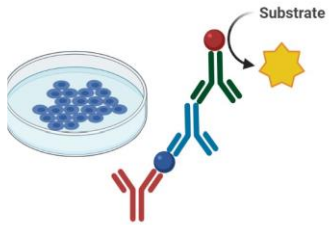


1. Rao S, Mondragon L, Pranjic B, Hanada T, Stoll G, Kocher T, et al. AIF-Regulated Oxidative Phosphorylation Supports Lung Cancer Development. Cell Research. 2018;29:579-91.

2. Masoud R, Reyes-Castellanos G, Lac S, Garcia J, Dou S, Shintu L, et al. Targeting Mitochondrial Complex I Overcomes Chemoresistance in High OXPHOS Pancreatic Cancer. Cell Reports Medicine. 2020;8.

Strategy

1-2 Years



Cell Culture

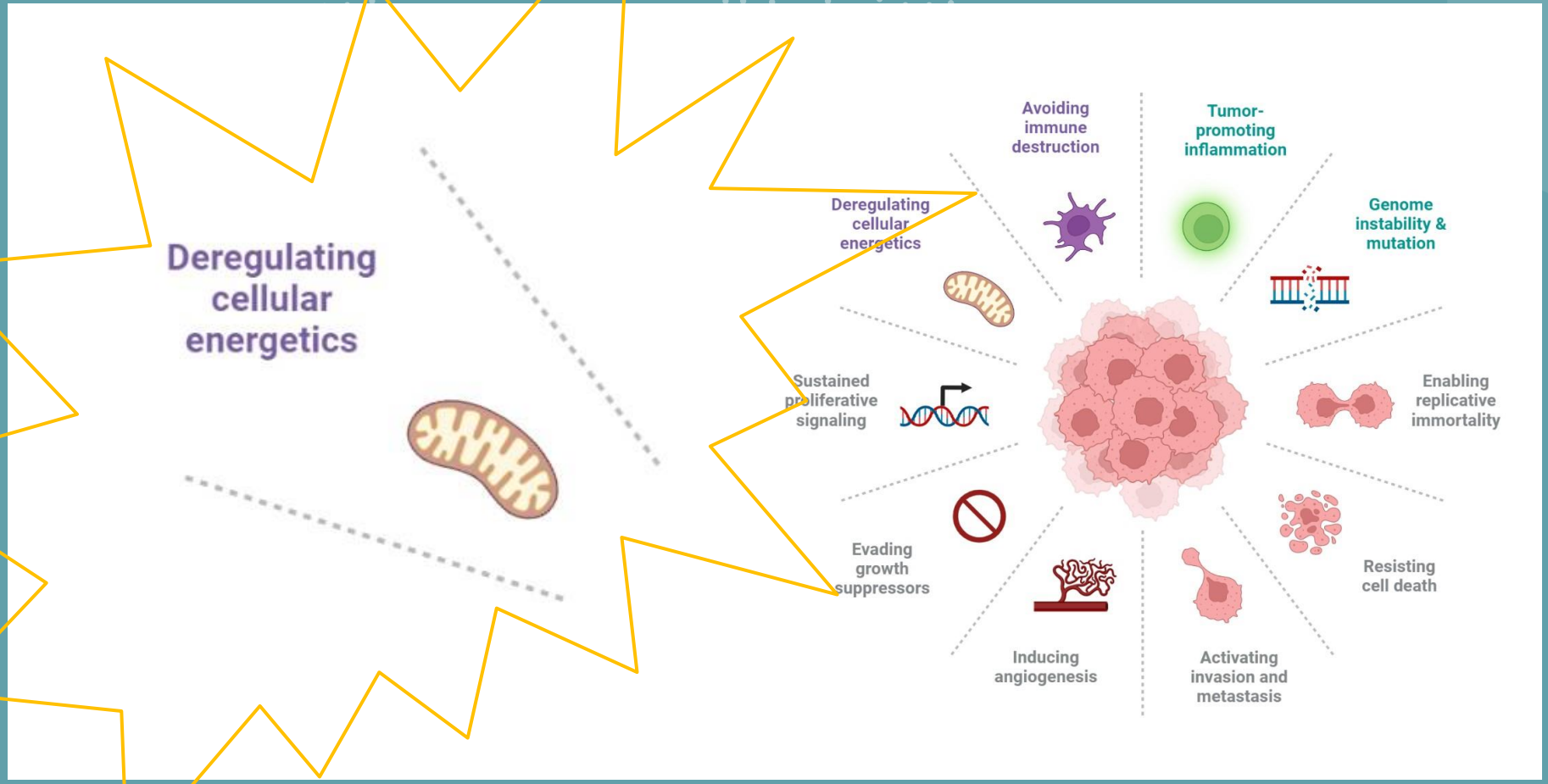
Metabolic Analysis

Tumor Xenografts

Phenformin Treatment

Significance

- Many treatments in clinical use do not target mitochondrial dysfunction



Significance continued…

Testing drugs that already exist for their potential in other diseases

- More is already known about the compound (recycling of knowledge)
- Can help in reducing costs for finding new drug compounds and toxicology in preclinical stage

Thank you for listening!

This presentation was created using Biorender.com