3rd International Electronic Conference on Metabolomics
15-30 November 2018
chaired by Prof. Peter Meikle, Dr. Thusitha W. Rupasinghe, Prof. Susan Sumner, Dr. Katja Dettmer-Wilde
sponsored by metabolites

Mitochondrial dysfunction and cancer metabolites and beyond

Christian Frezza

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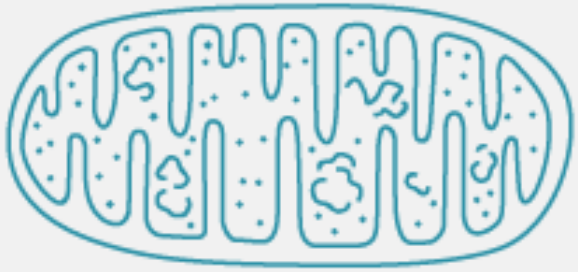
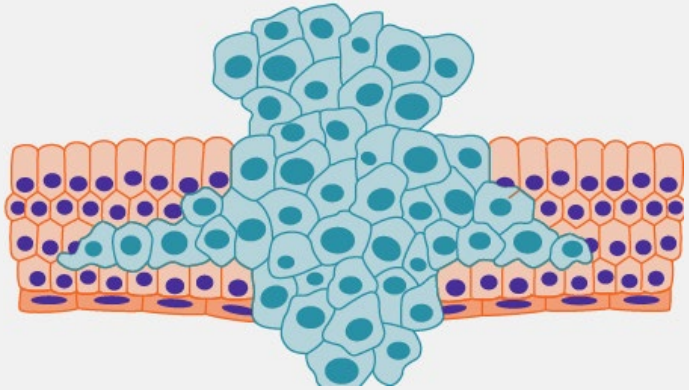
OXPHOS suppression

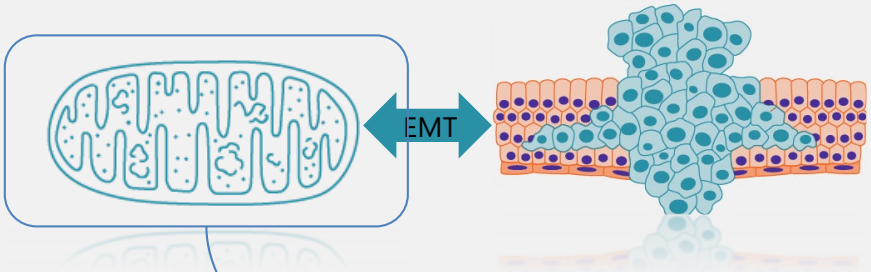


EMT

Cancer



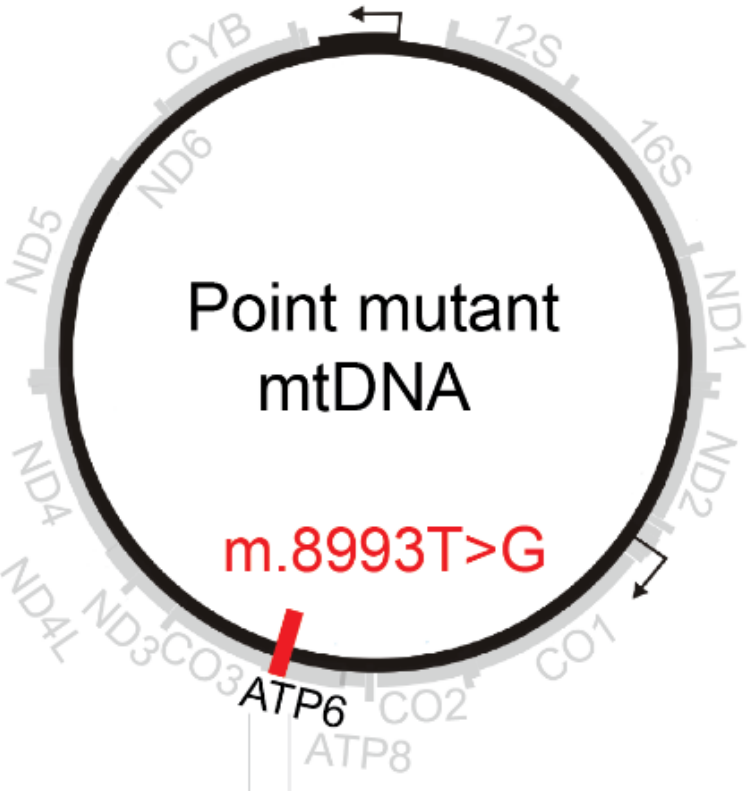
Metastasis

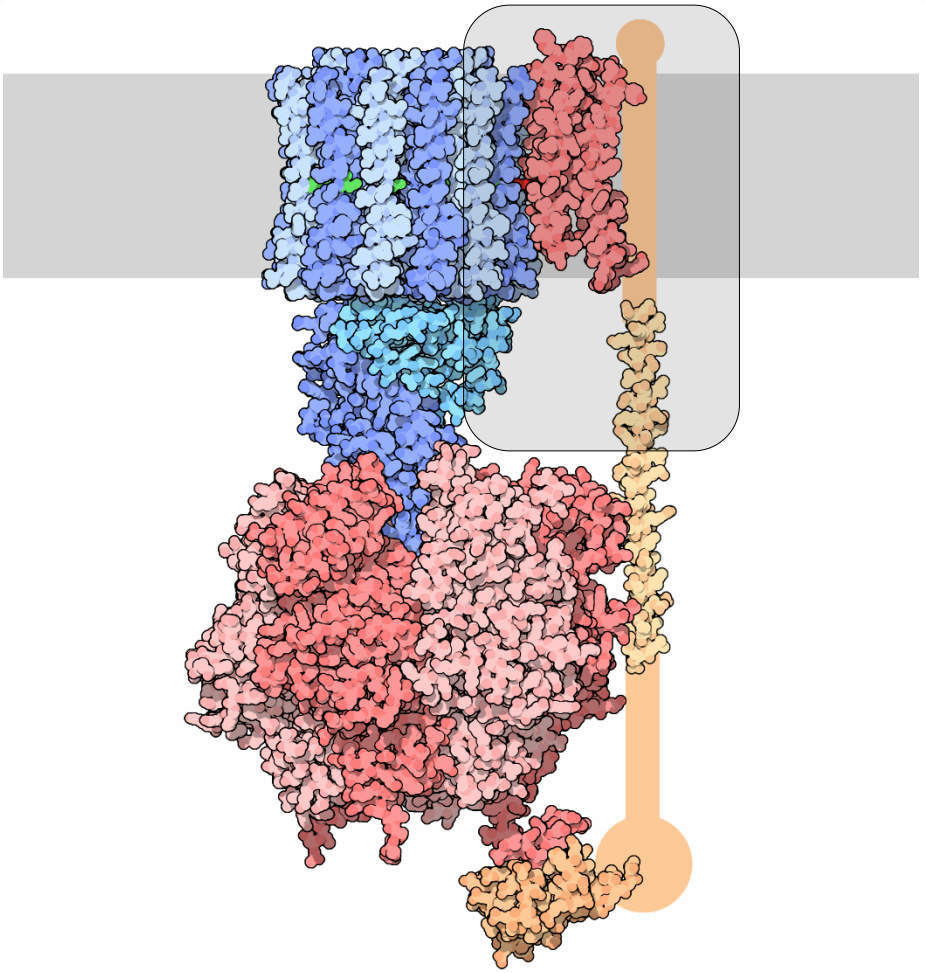


mTUNE

Edoardo Gaude

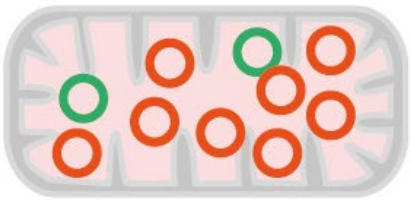
A model of primary mitochondrial dysfunction





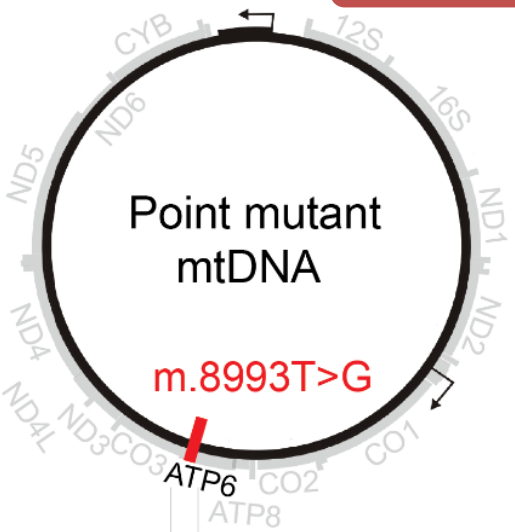
Neuropathy, ataxia and retinitis pigmentosa (**NARP**) syndrome

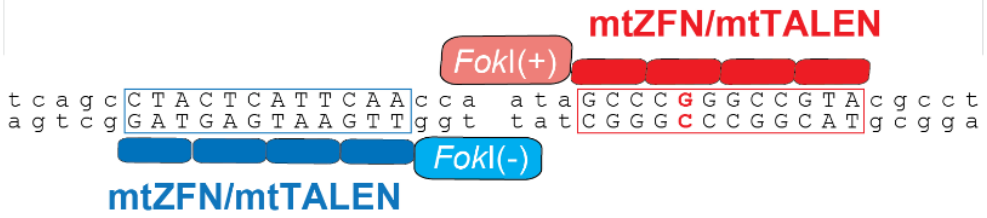
Heteroplasmy shift using mtZFN



mutant mtDNA
wt mtDNA

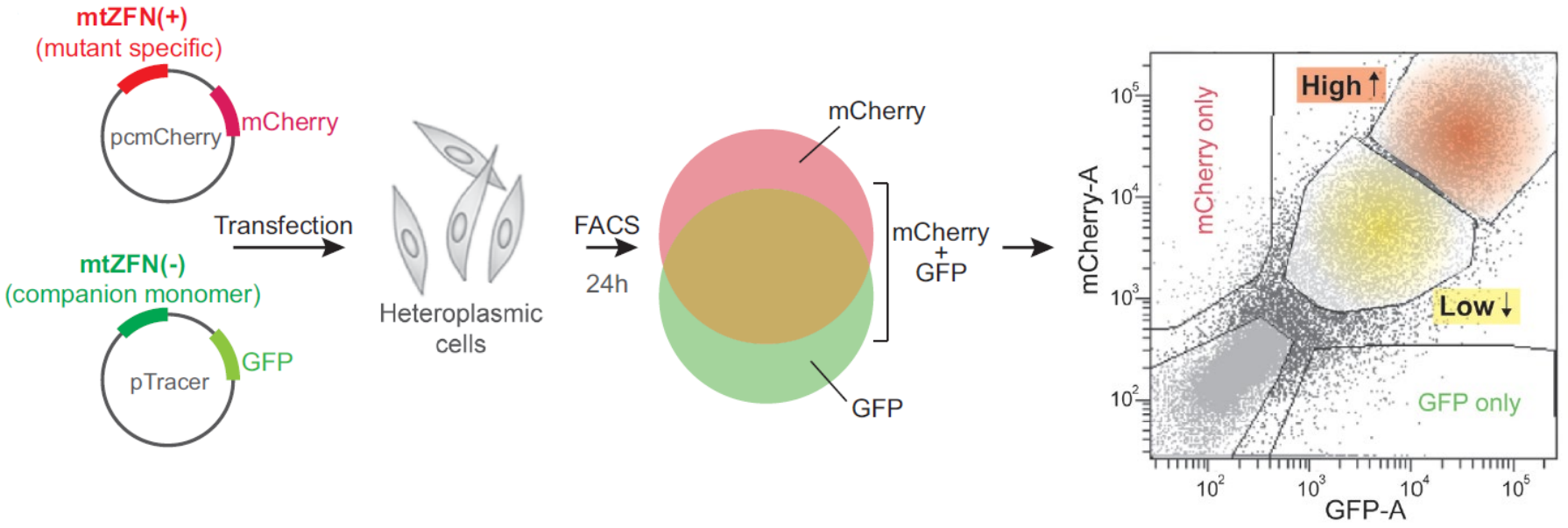
Heteroplasmy shift





Michal Minczuk & Payam Gammage
Mitochondrial Biology Unit, Cambridge, UK

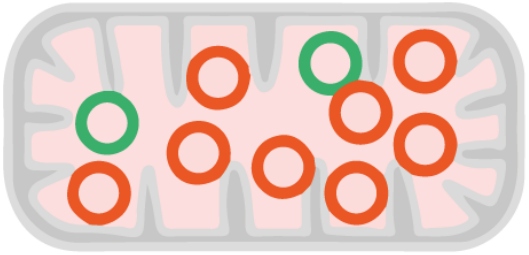
Tunable heteroplasmy shift

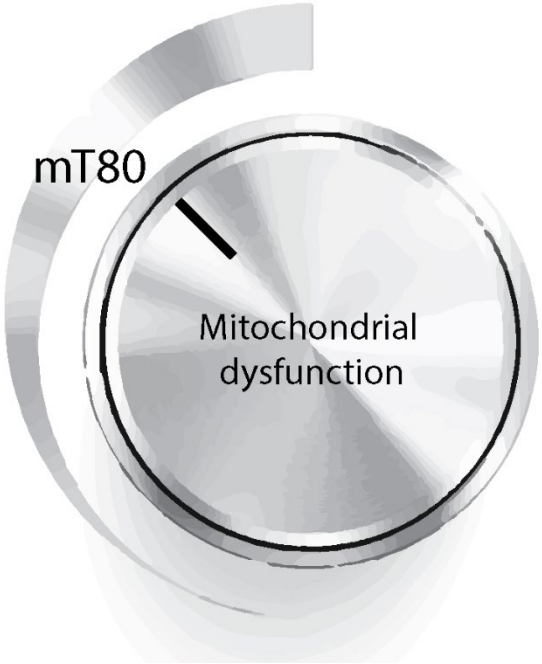


Michal Minczuk
Payam Gammage

mTune: a model of **tunable** mitochondrial dysfunction

143B osteosarcoma

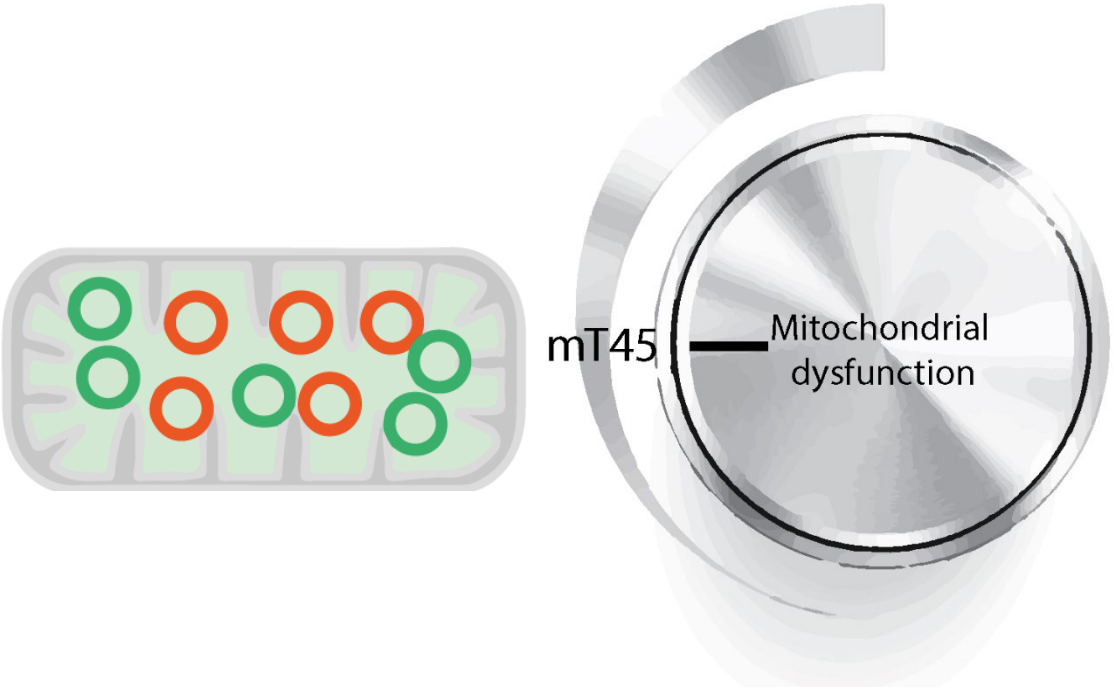




mutant mtDNA

wt mtDNA

mTune: a model of **tunable** mitochondrial dysfunction



mutant mtDNA

wt mtDNA

mTune: a model of **tunable** mitochondrial dysfunction

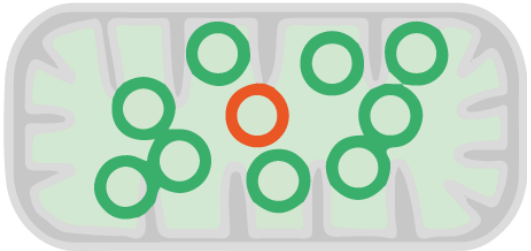
mTUNE:

Stable over time

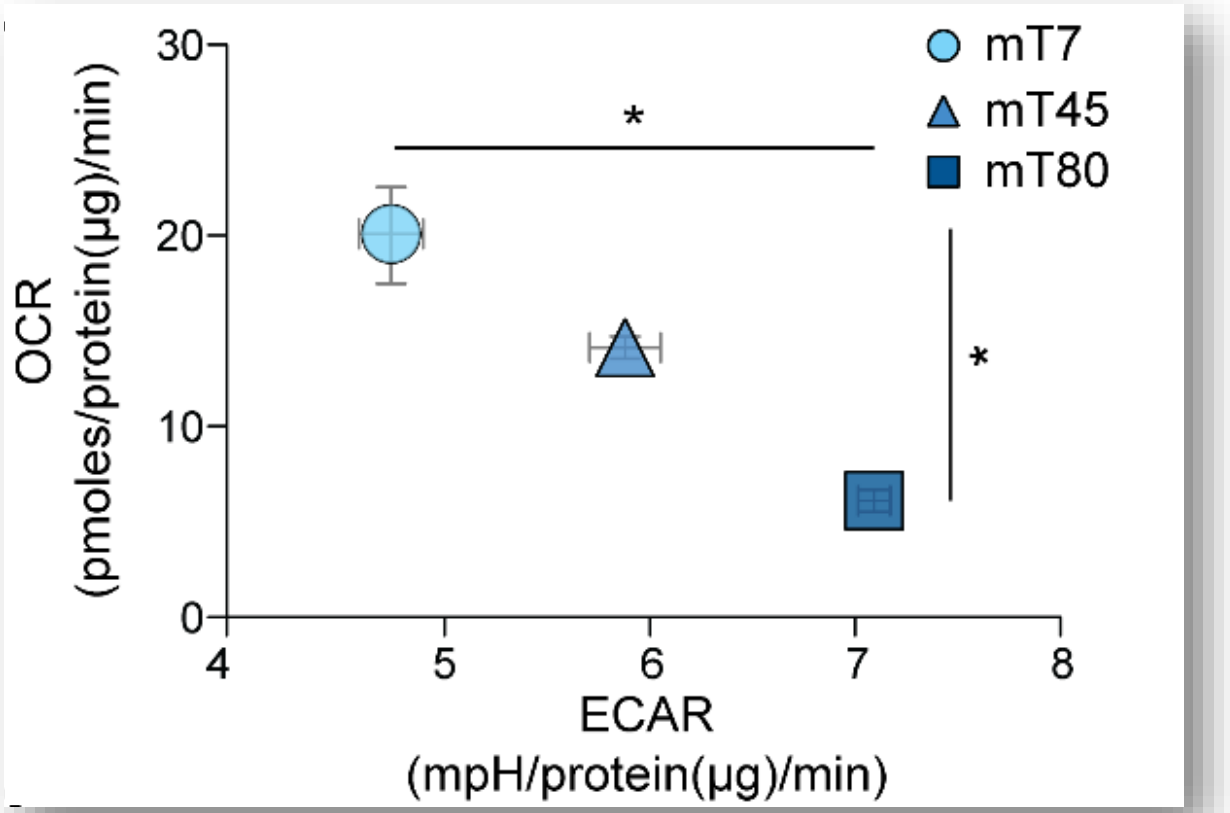
Do not undergo selection

mutant mtDNA

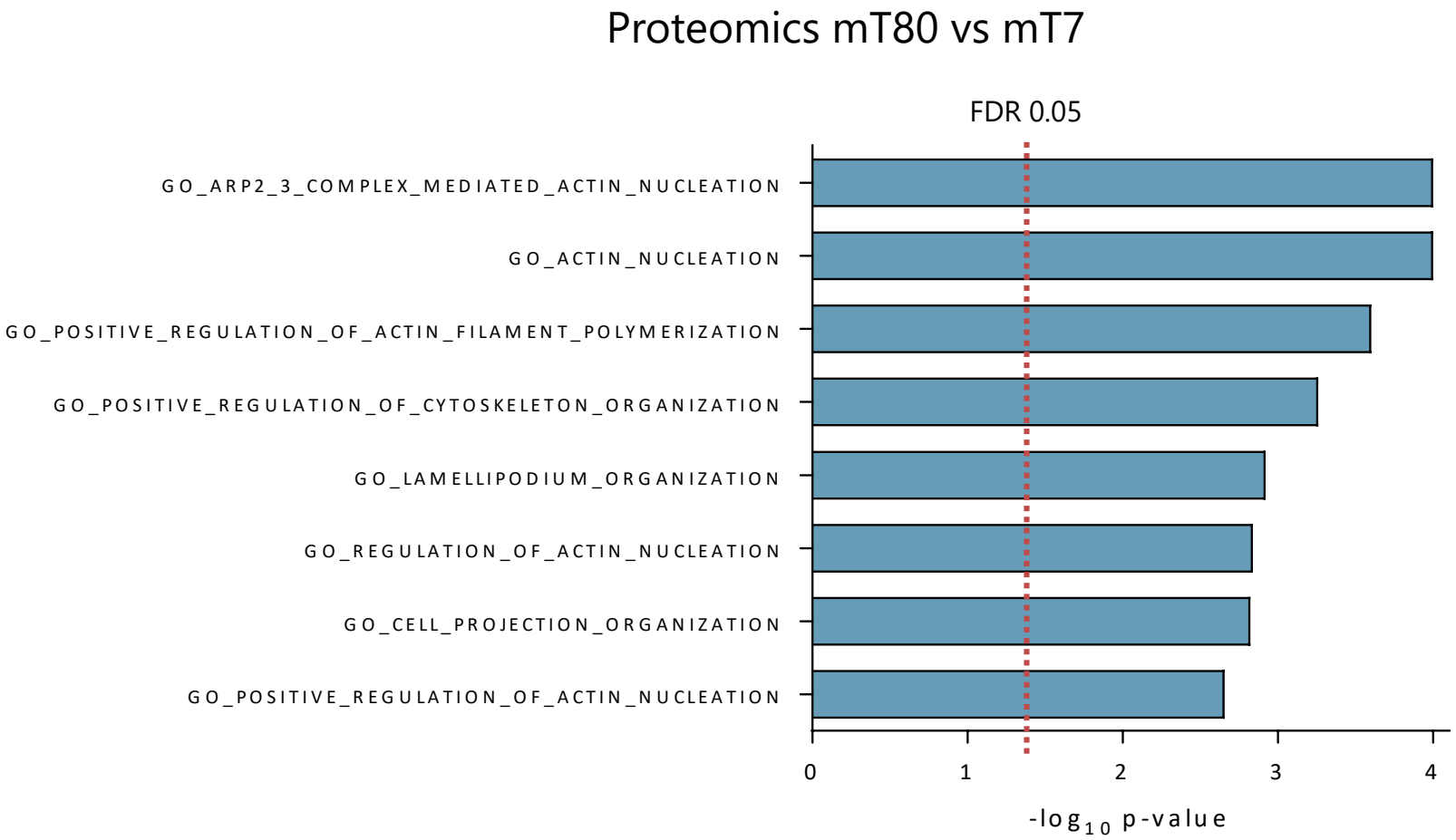
wt mtDNA



Metabolic defects in mTune

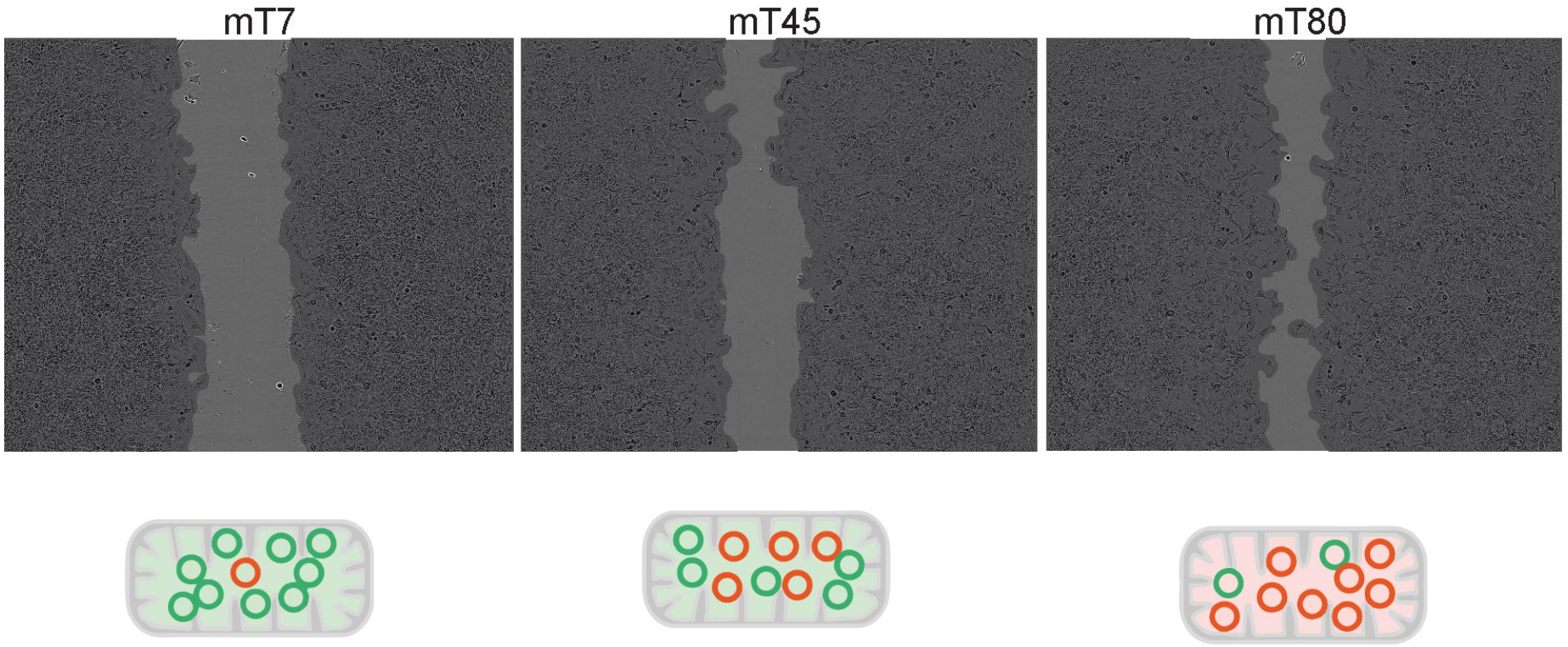


mTune and cytoskeleton remodeling

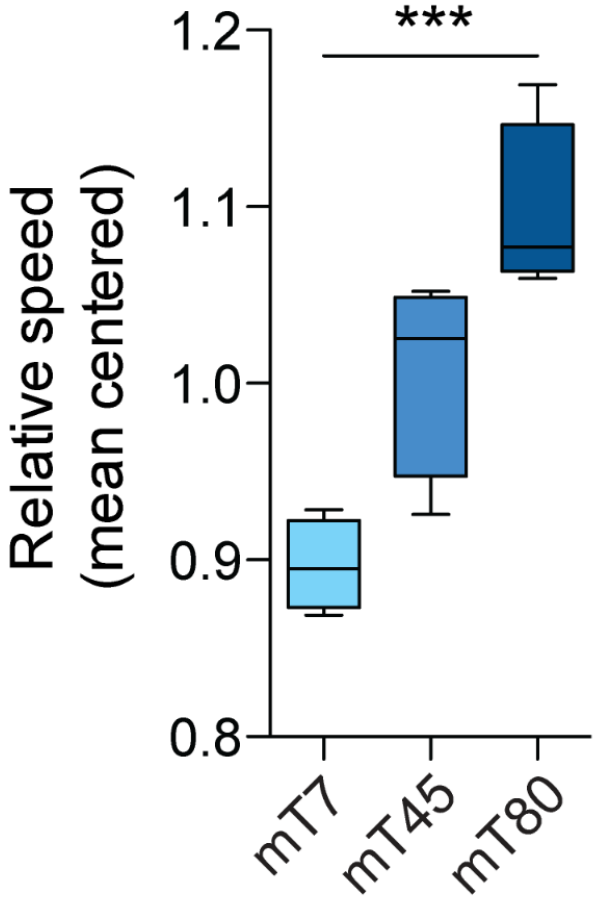


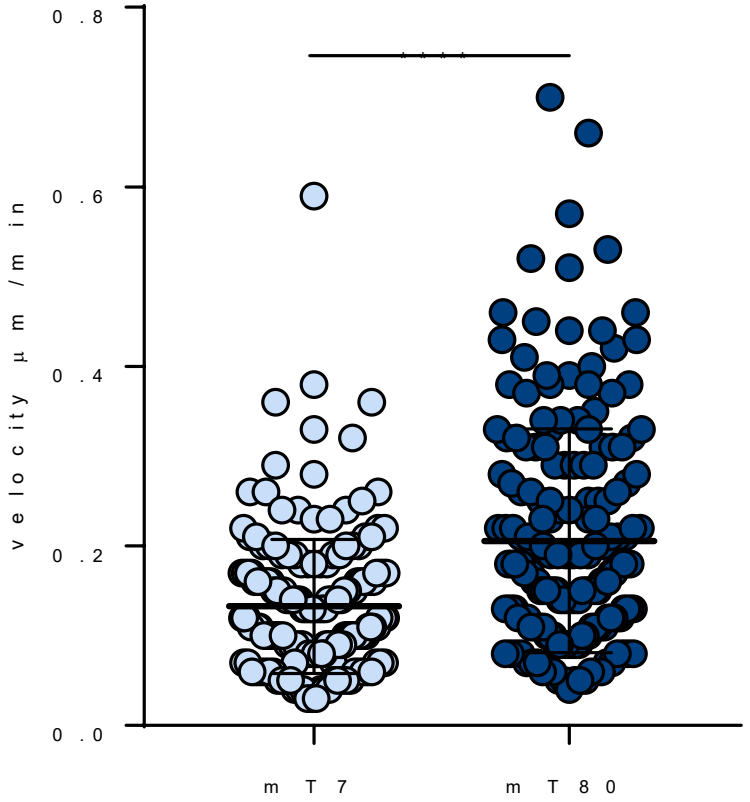
In collaboration with Julio Saez Rodriguez and Aurelien Dugourd, **University of Heidelberg**

mTune in wound healing assay



Migration speed in mTune





Sarah Palmer, Norman Lab,
Beatson Institute, Glasgow

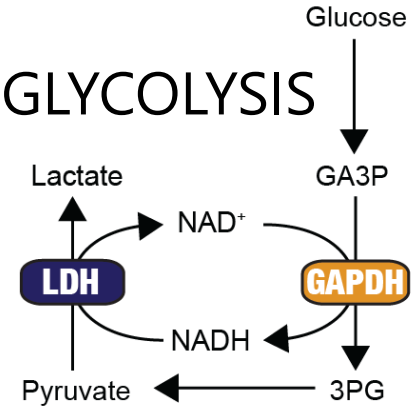
Glycolysis supports cell migration

A computational study of the Warburg effect identifies metabolic targets inhibiting cancer migration

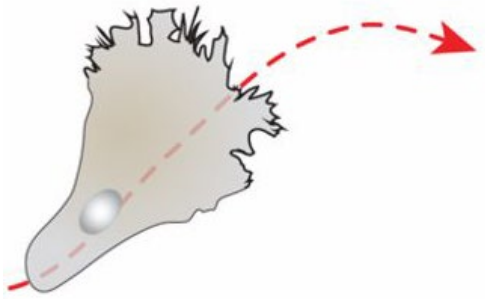
Keren Yizhak[1,*,†], Sylvia E Le Dévédec[2,†], Vasiliki Maria Rogkoti[2], Franziska Baenke[3], Vincent C de Boer[4], Christian Frezza[5], Almut Schulze[3], Bob van de Water[2,‡] & Eytan Ruppin[1,6,‡,**]

MITOCHONDRIA

GLYCOLYSIS

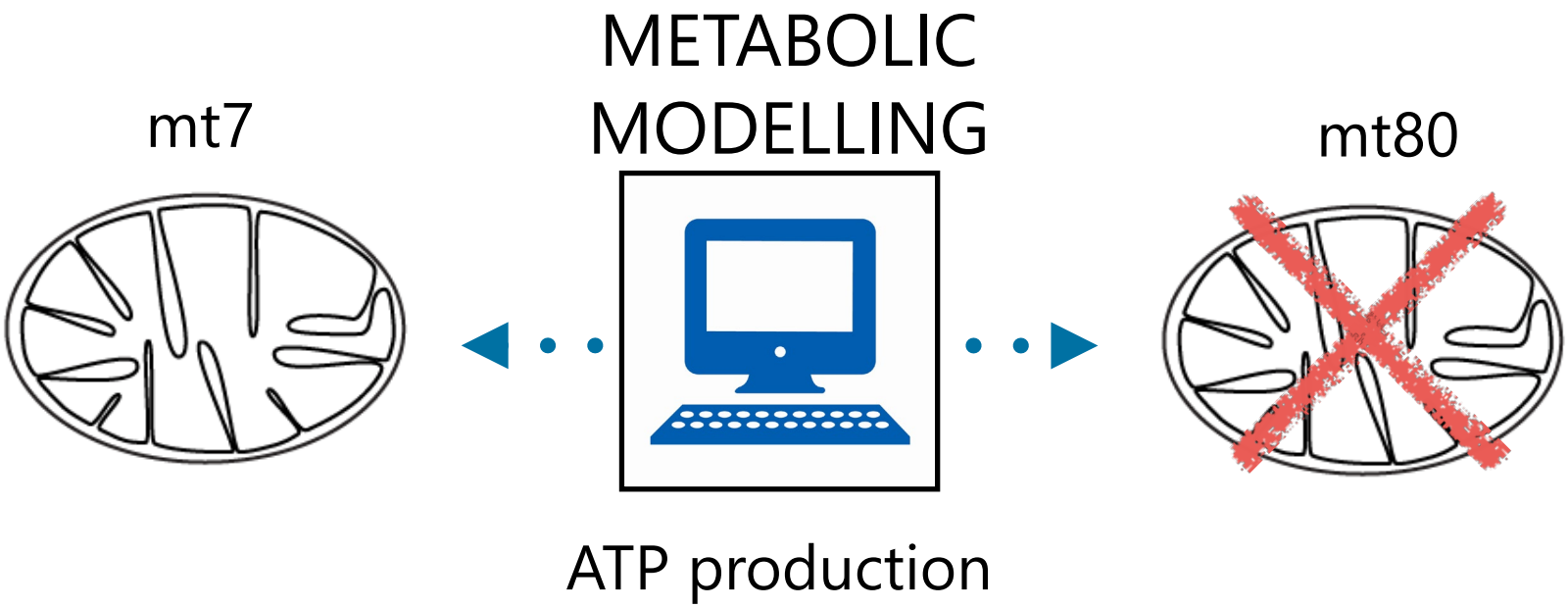


ATP



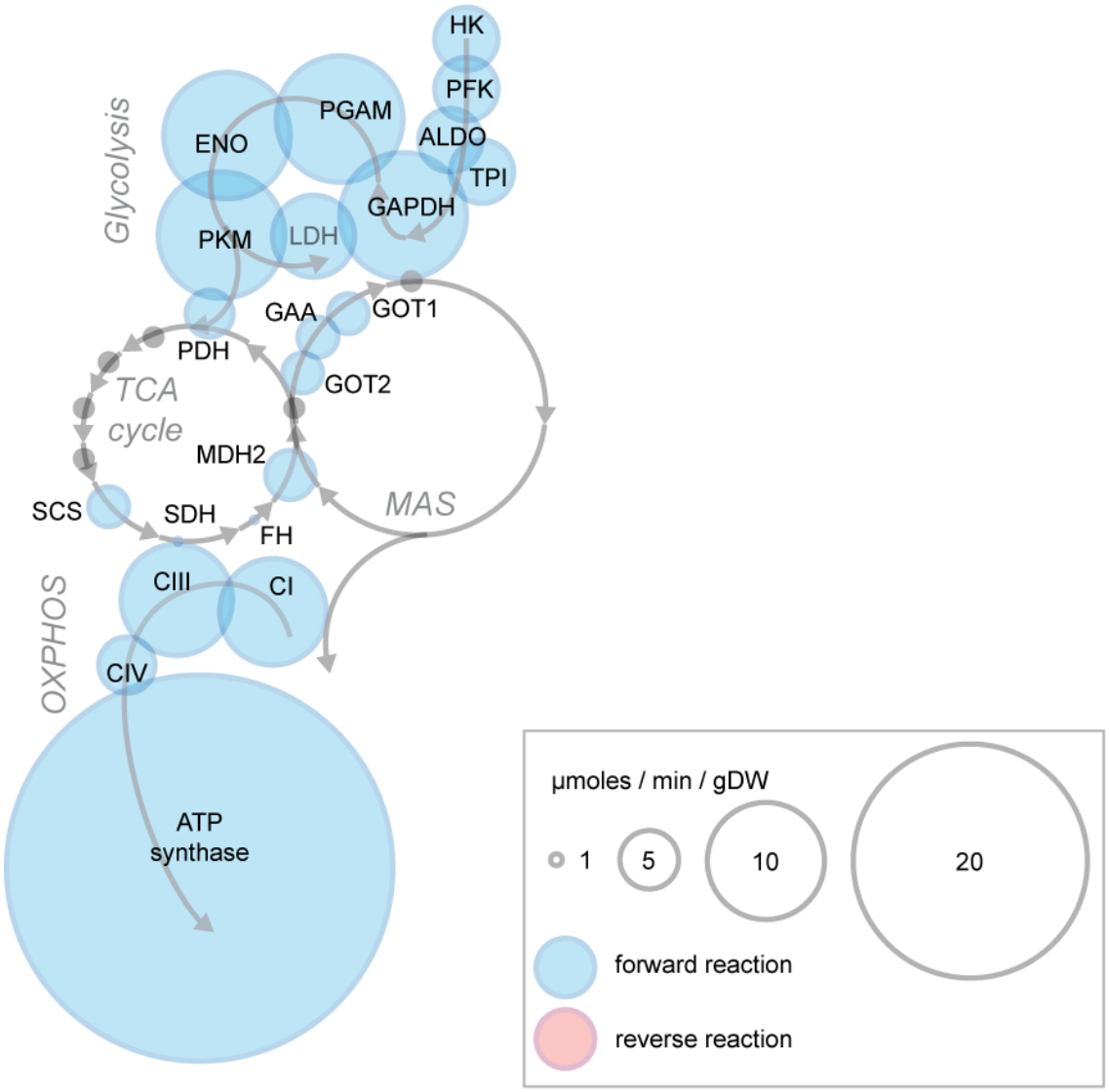
migration

Metabolic modelling of mTune

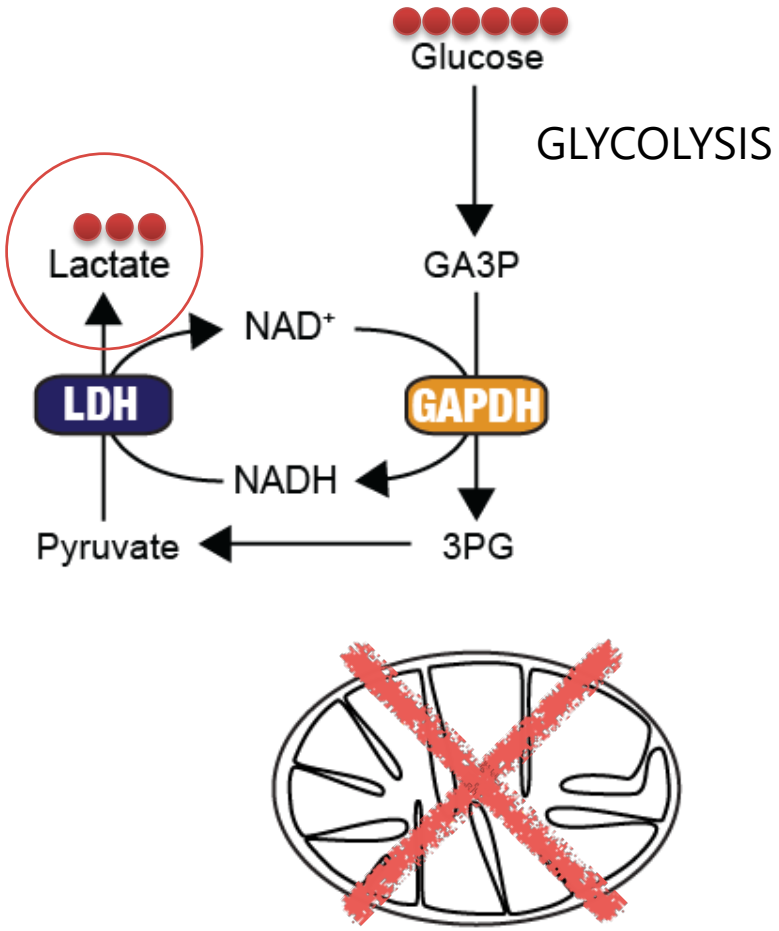


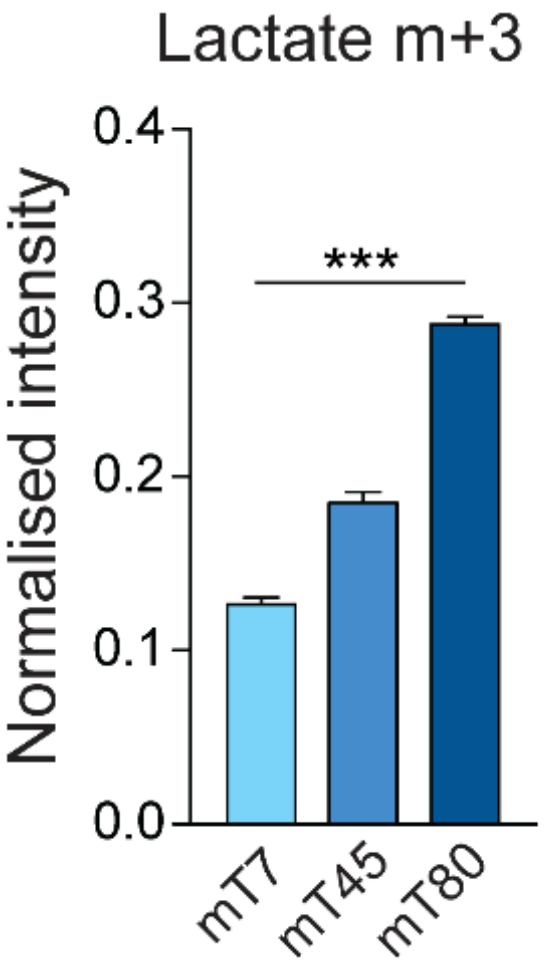
Metabolic models of mT7 and mt80

mt7 **mt80**



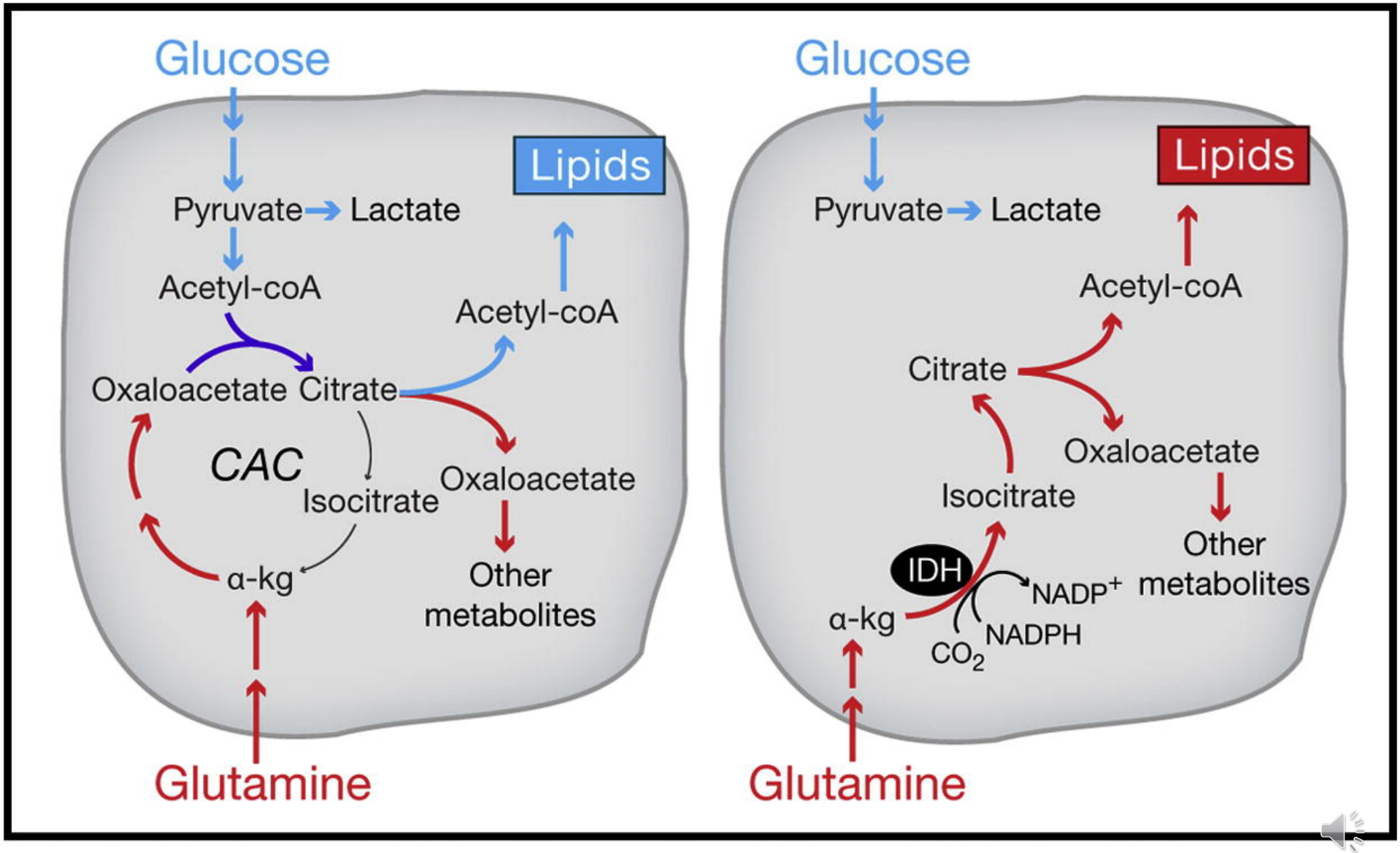
Glycolysis is increased in mT80



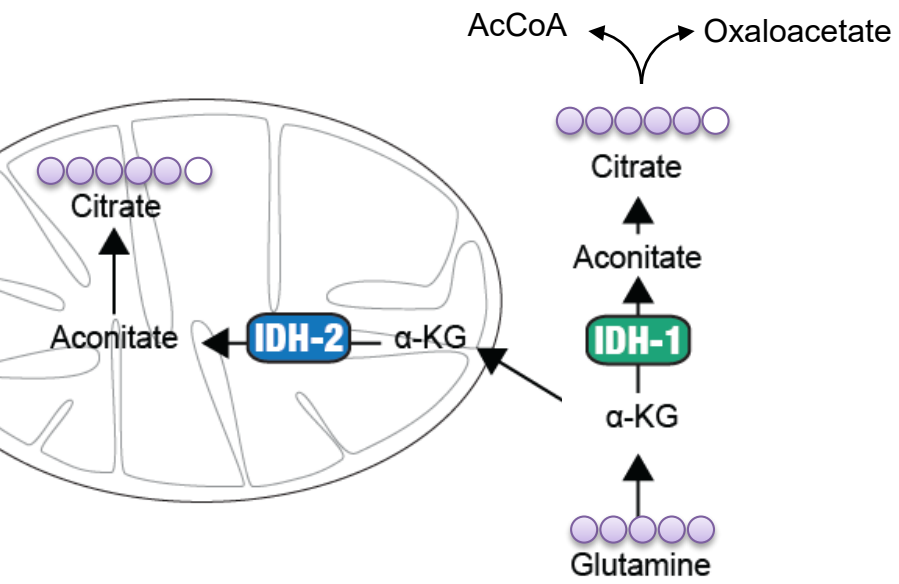


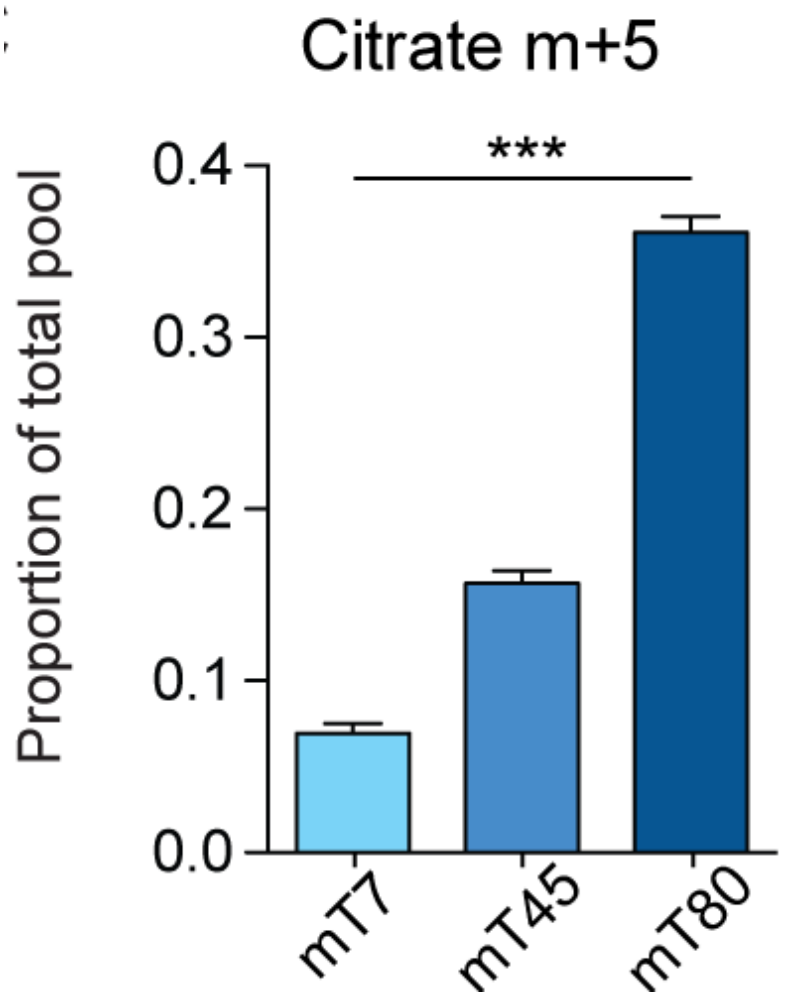
Reductive carboxylation of glutamine

Reductive carboxylation

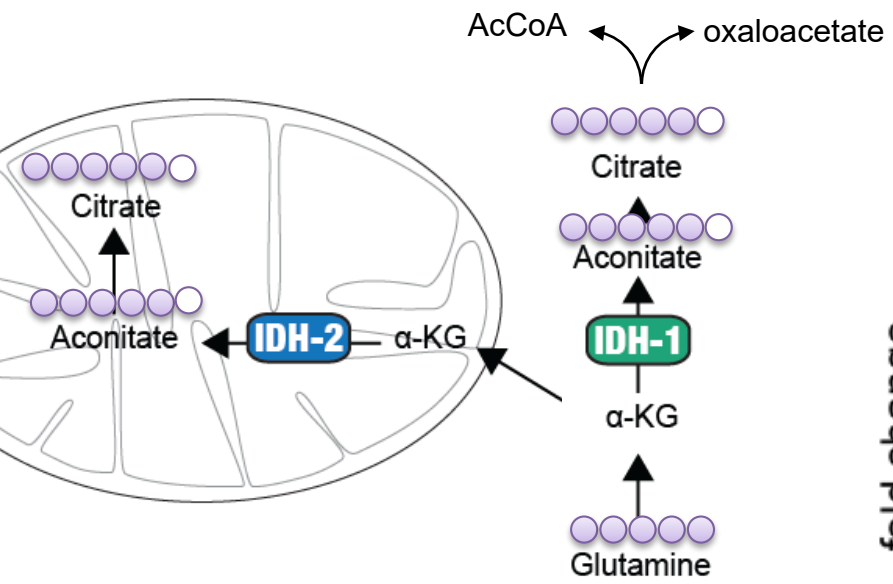


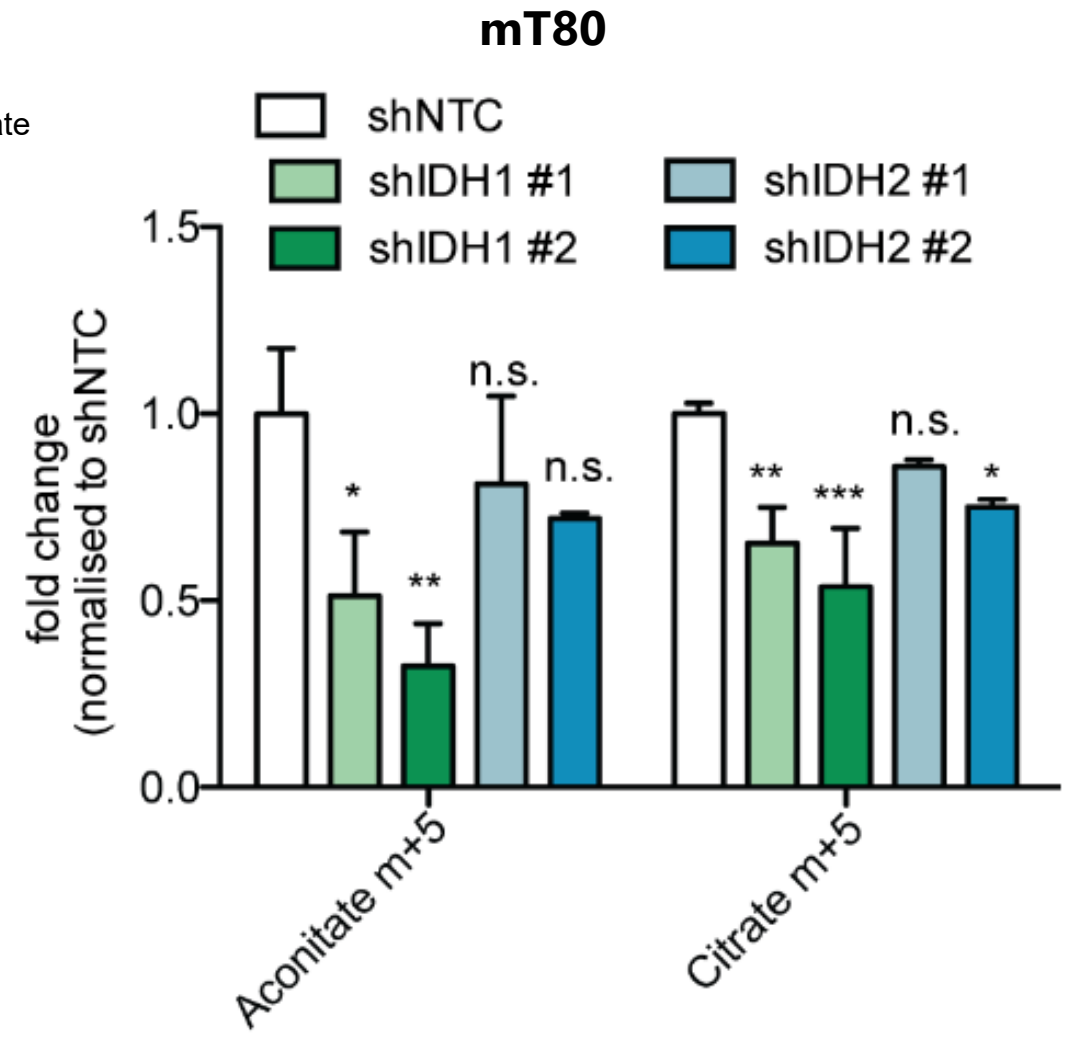
Reductive carboxylation in mTune



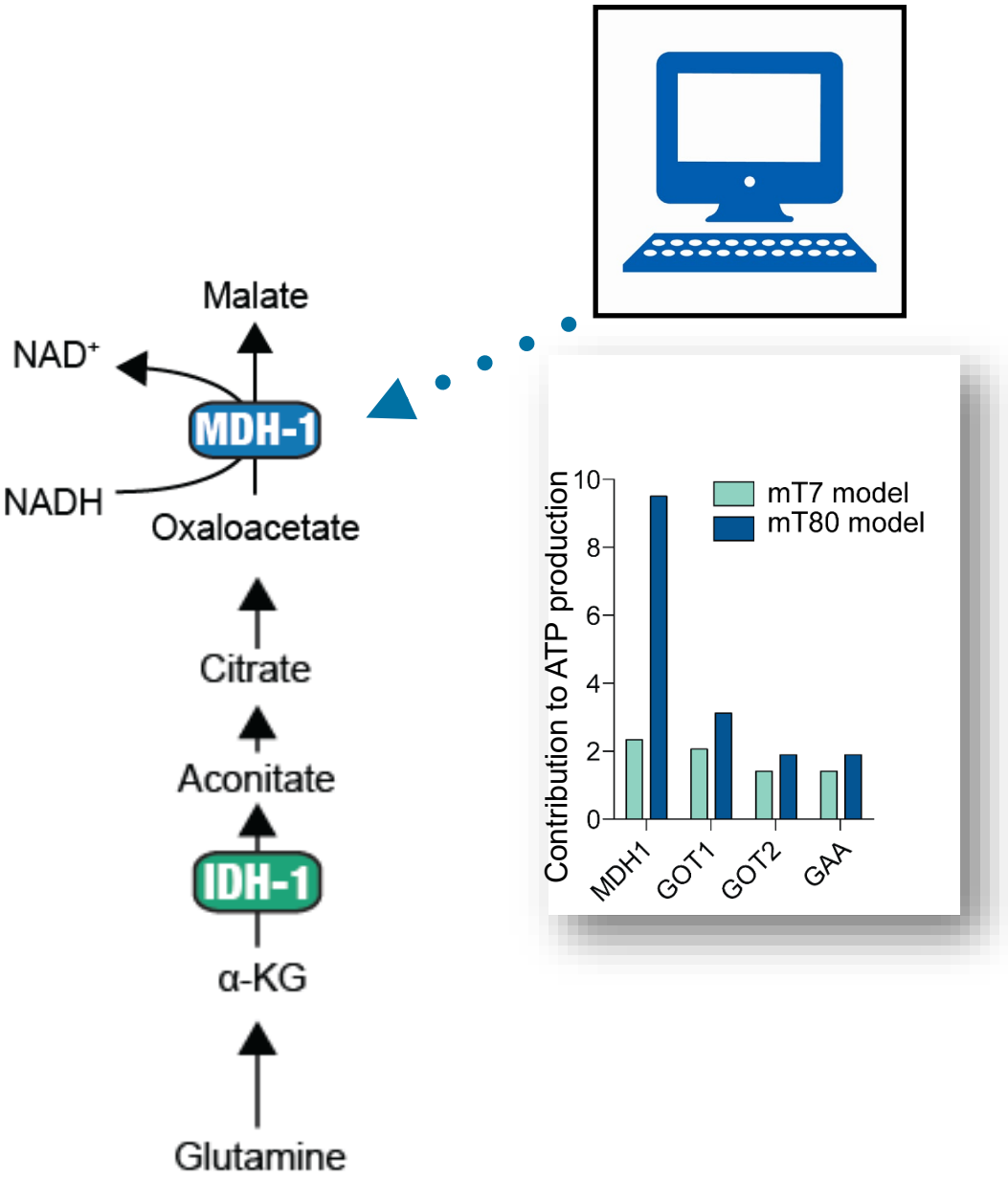


Reductive carboxylation occurs in the cytosol

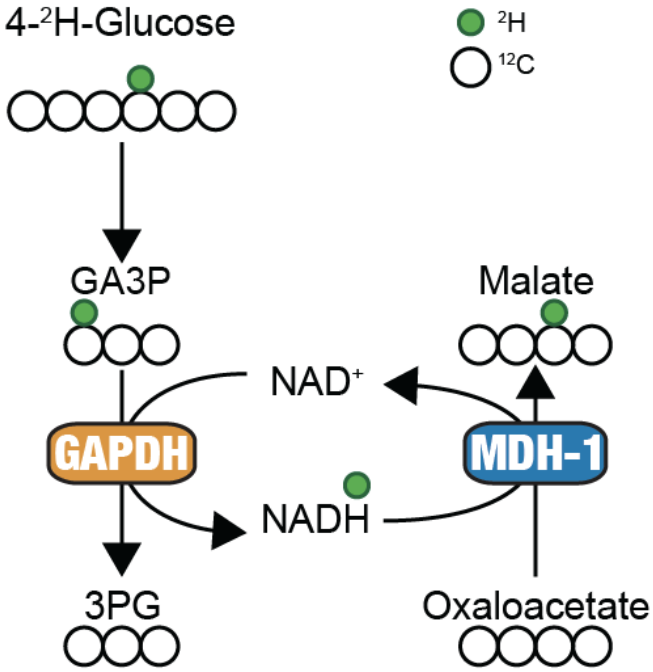


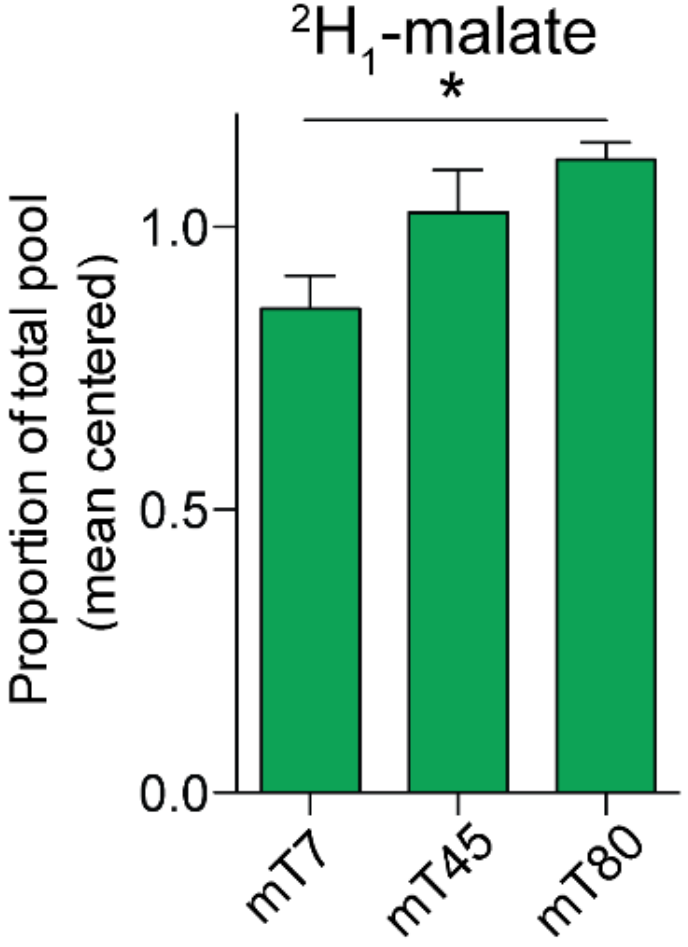


MDH1 links reductive carboxylation to glycolysis

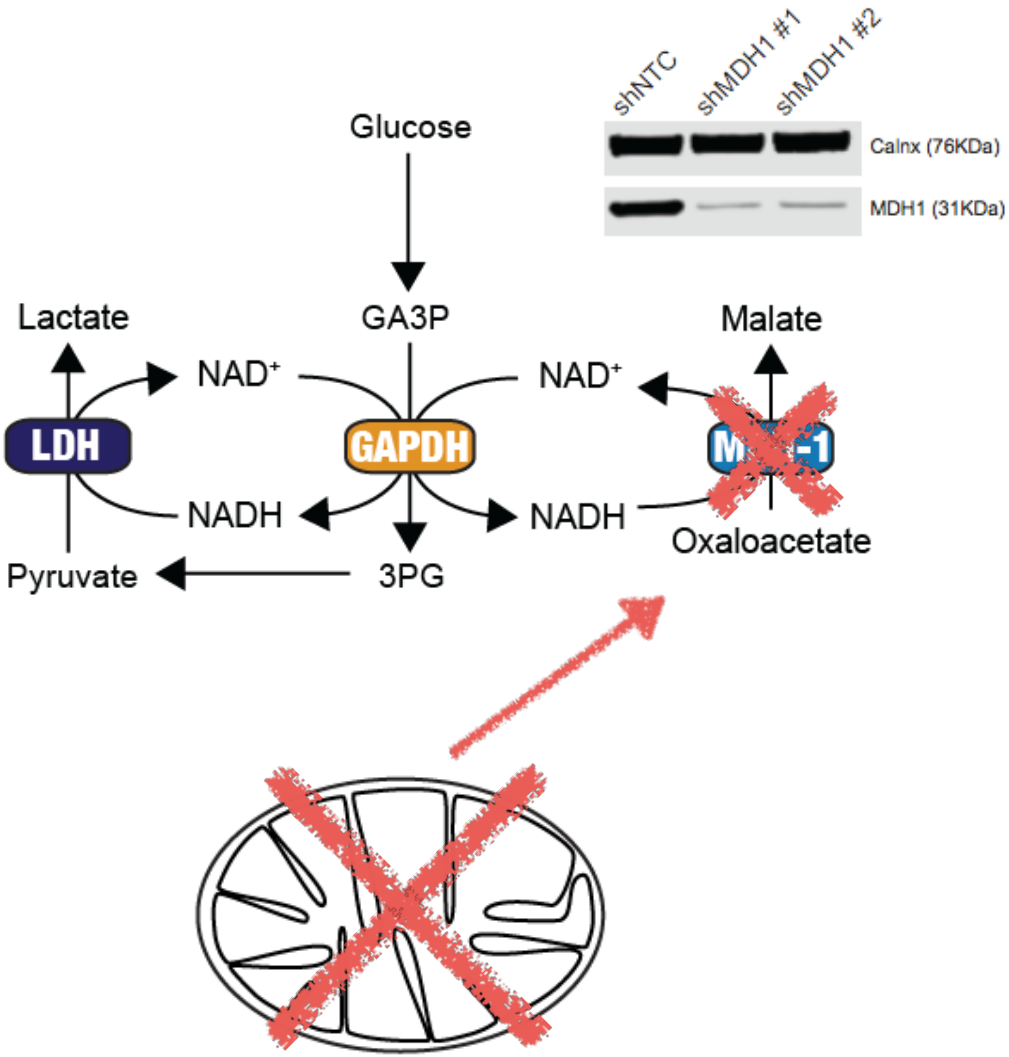


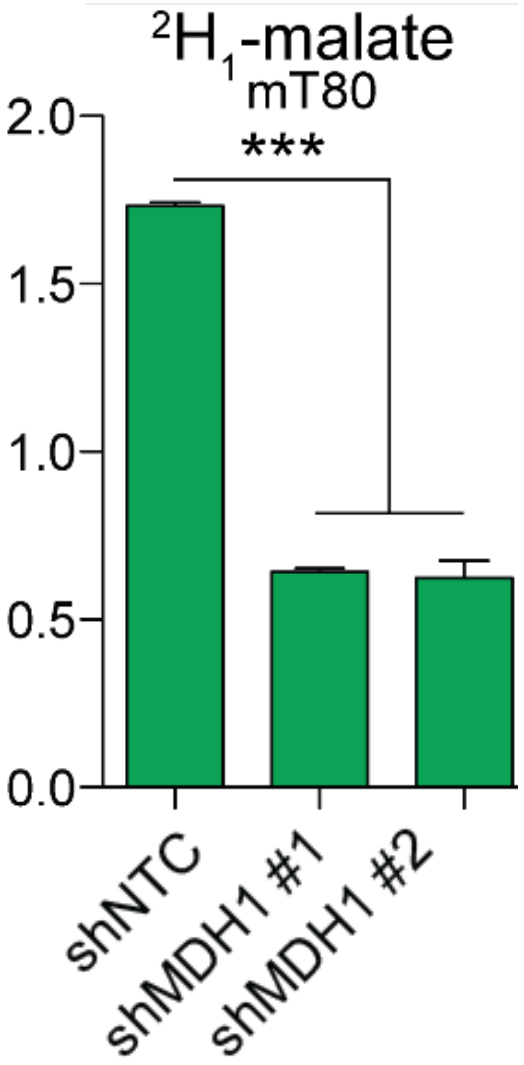
MDH1 recycles NADH for glycolytic GAPDH



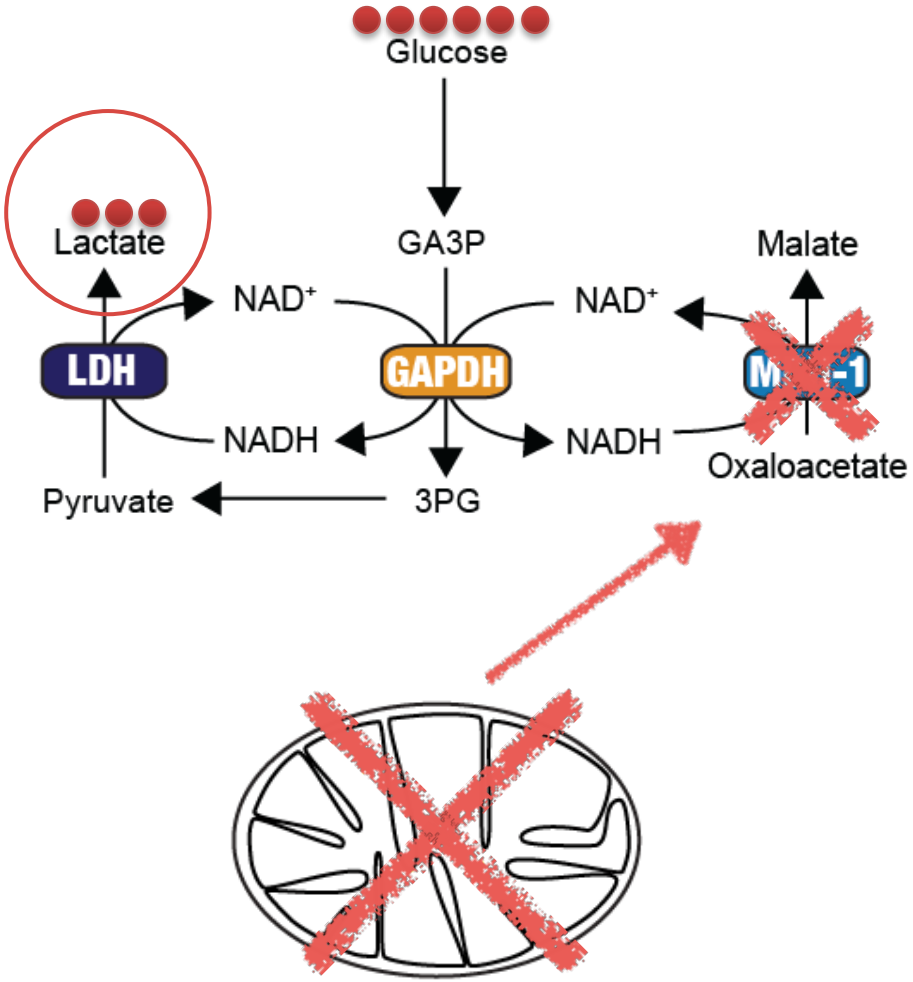


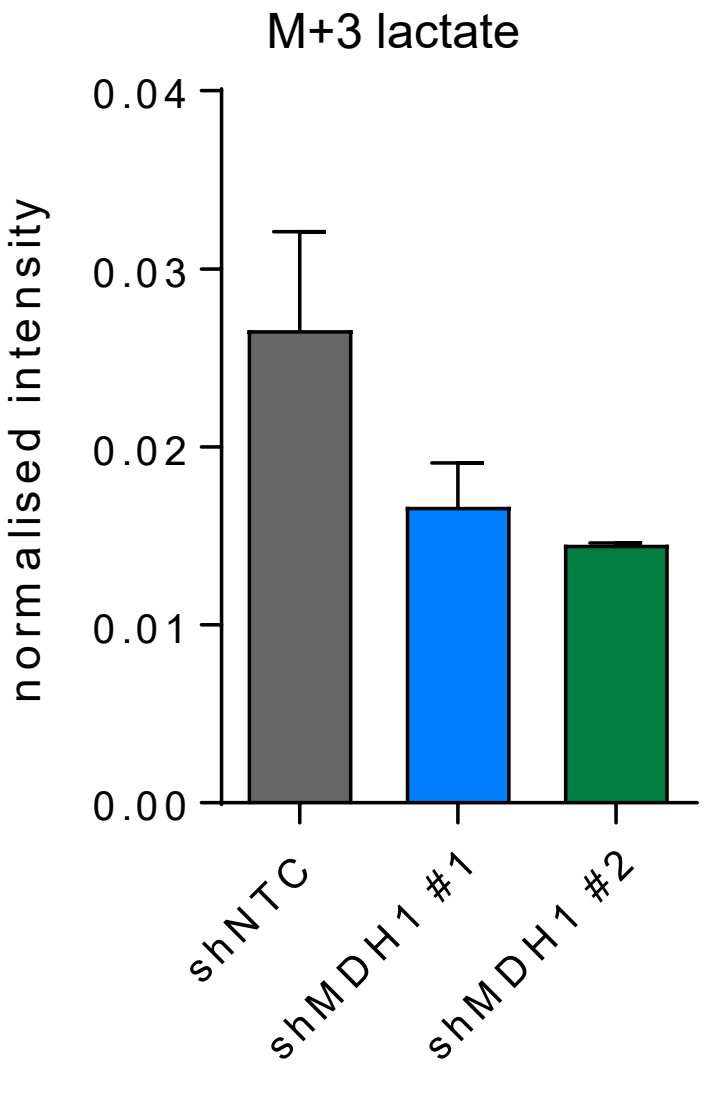
MDH1 and glycolysis



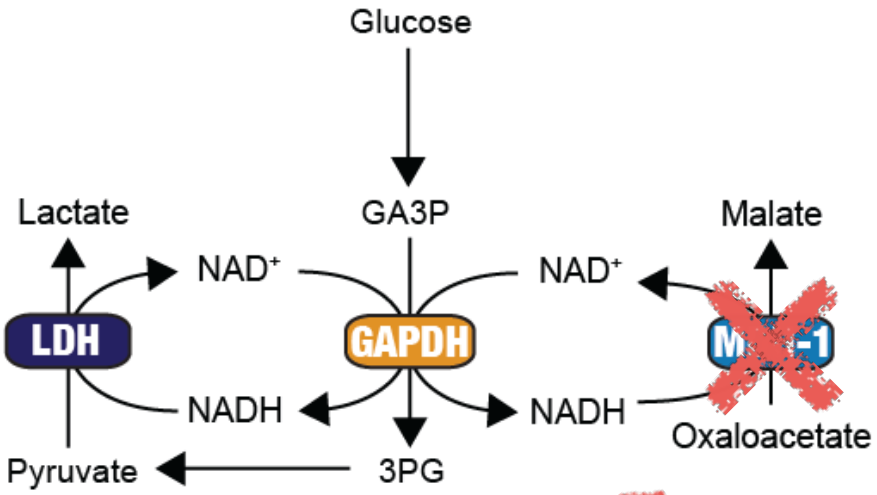


MDH1 and glycolysis





MDH1 and migration



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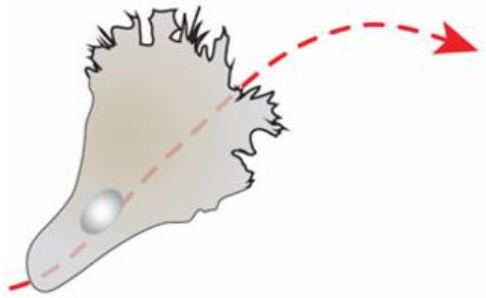
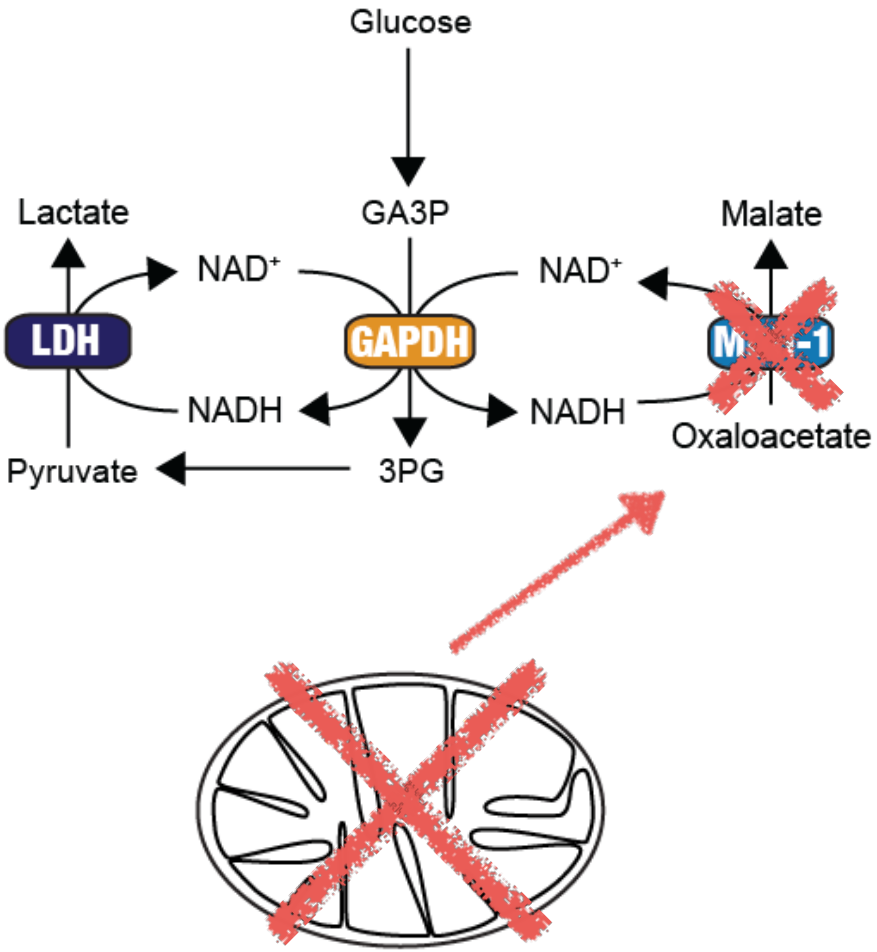
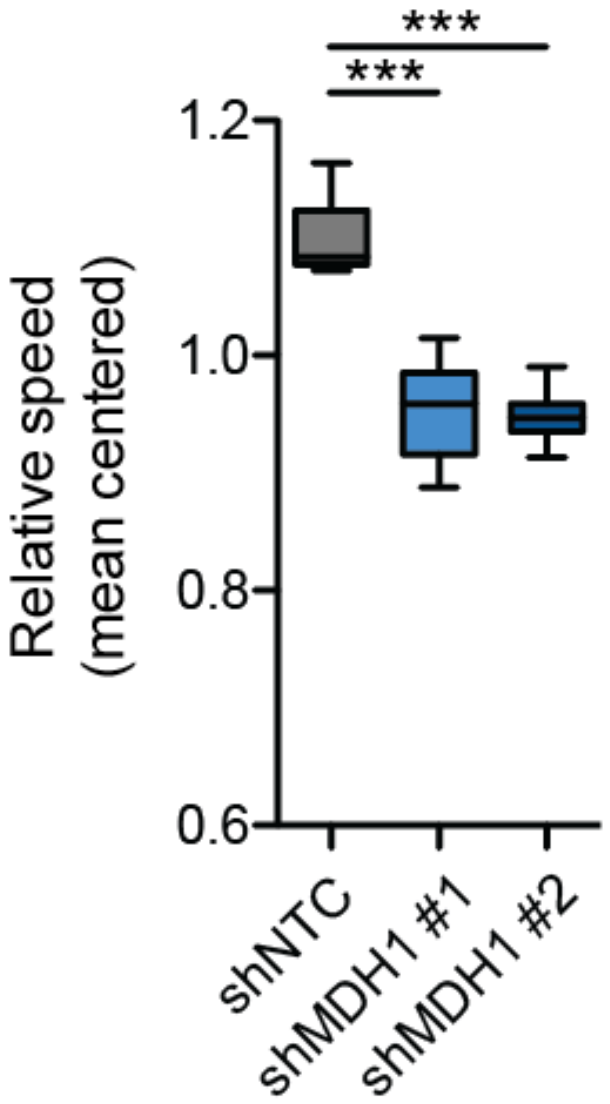
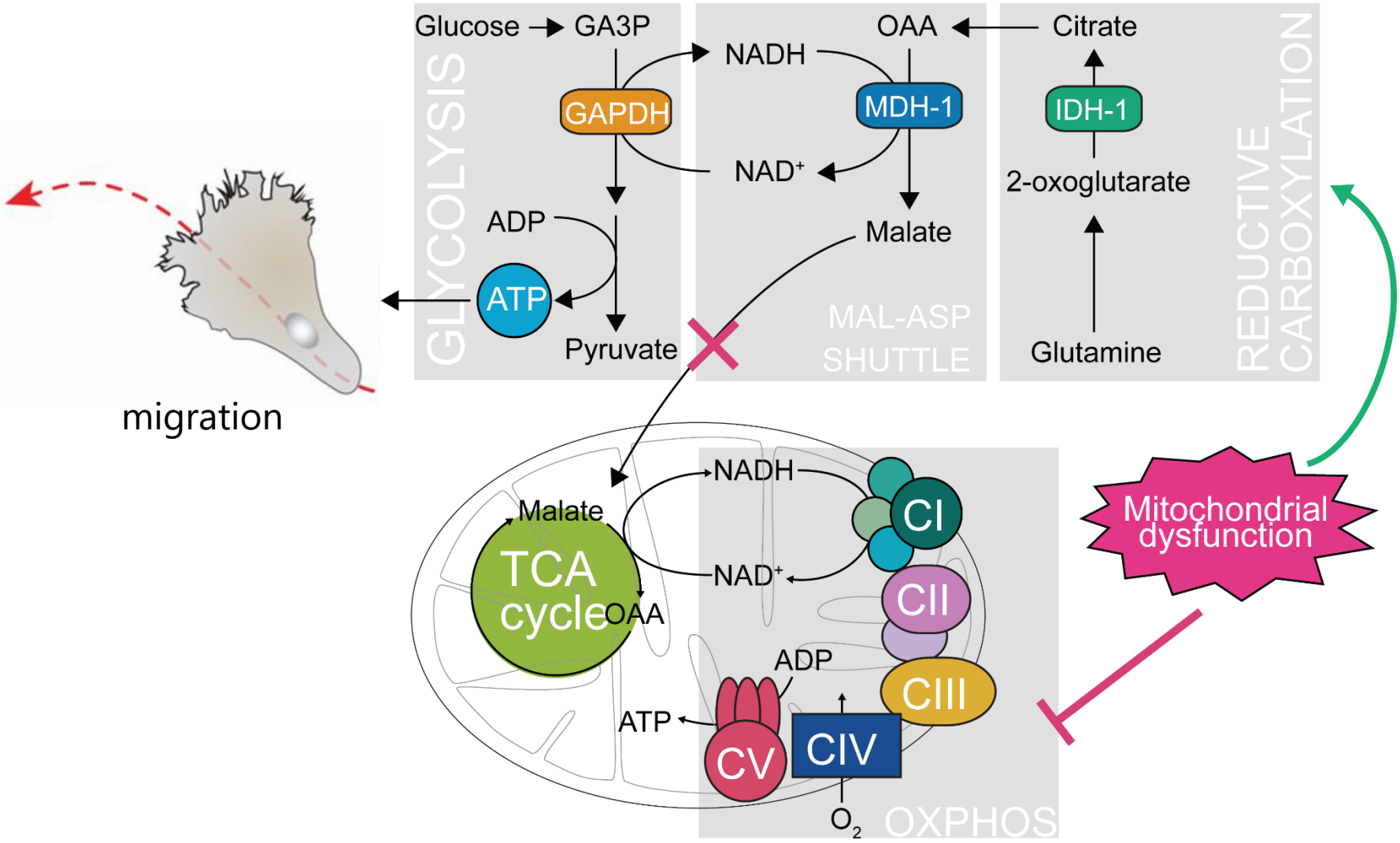


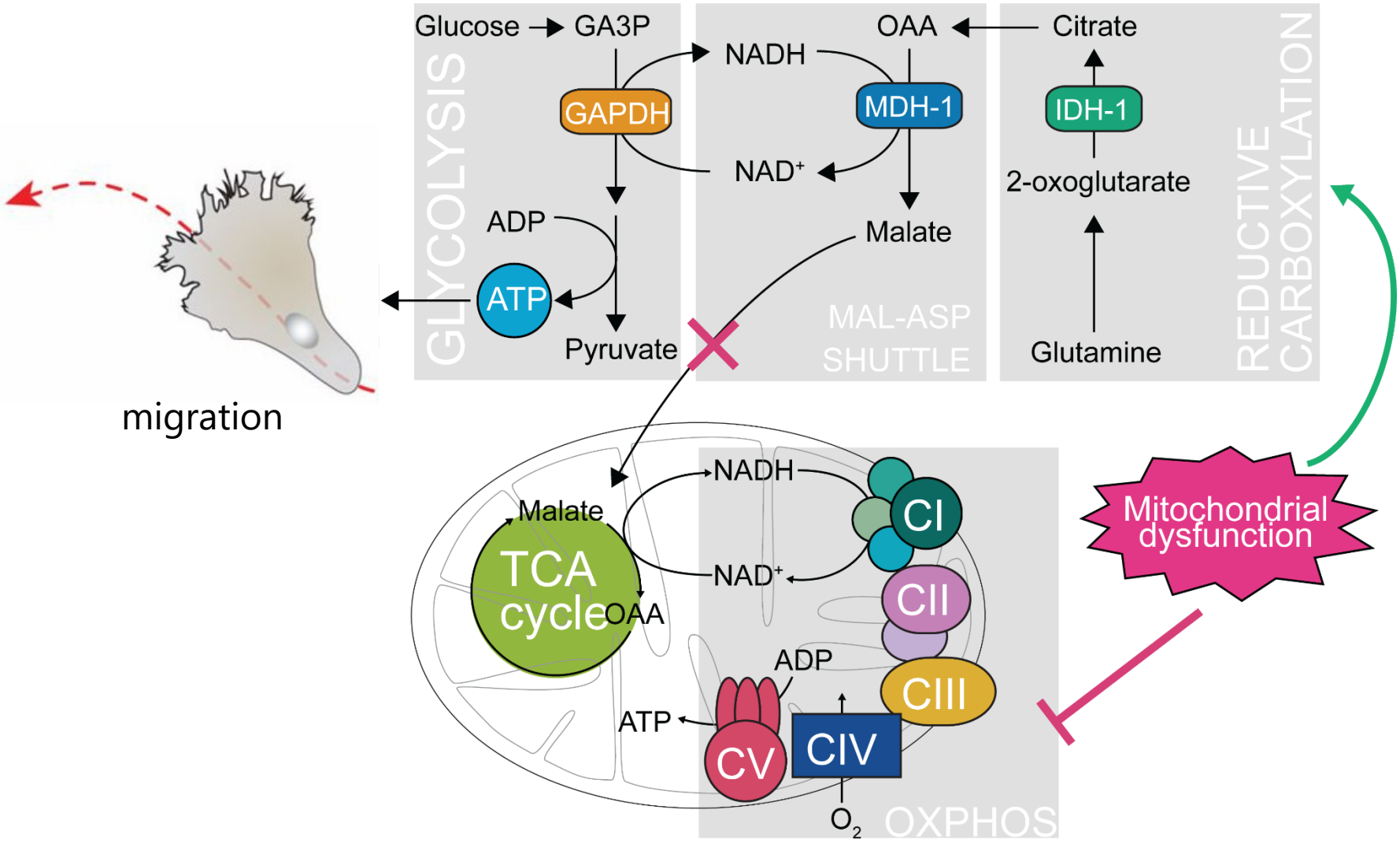
migration

MDH1 supports cell migration






migration
GLYCOLYSIS
Glucose
GA3P
GAPDH
ADP
ATP
Pyruvate
NADH
NAD+
MDH-1
OAA
Malate
MAL-ASP SHUTTLE
Citrate
IDH-1
2-oxoglutarate
Glutamine
REDUCTIVE CARBOXYLATION
Malate
TCA cycle
OAA
NADH
NAD+
CI
CII
CIII
CIV
CV
ADP
ATP
O2
OXPHOS
Mitochondrial dysfunction



For more details check Gaude et al, Mol Cell 2018

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