Ecological effects of mitochondrial dysfunction in pancreatic cancer

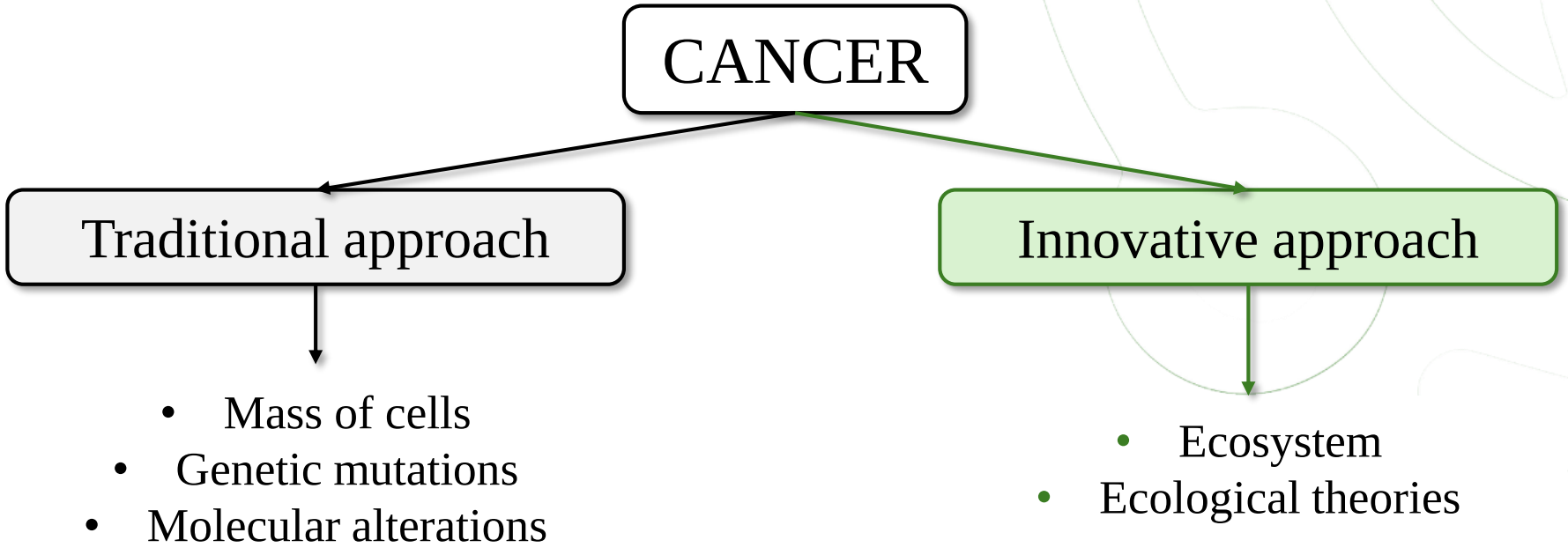
Grazia Bramato, Giulia Girolimetti, Sinforosa Gagliardi, Paola Cordella, Roberta Romano, Flora Guerra, Cecilia Bucci

University of Salento, Via Provinciale Lecce-Monteroni n. 165, 73100 Lecce, Italy

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 “Education and Research” - Component 2: “From research to business” - Investment 3.1: “Fund for the realisation of an integrated system of research and innovation infrastructures”

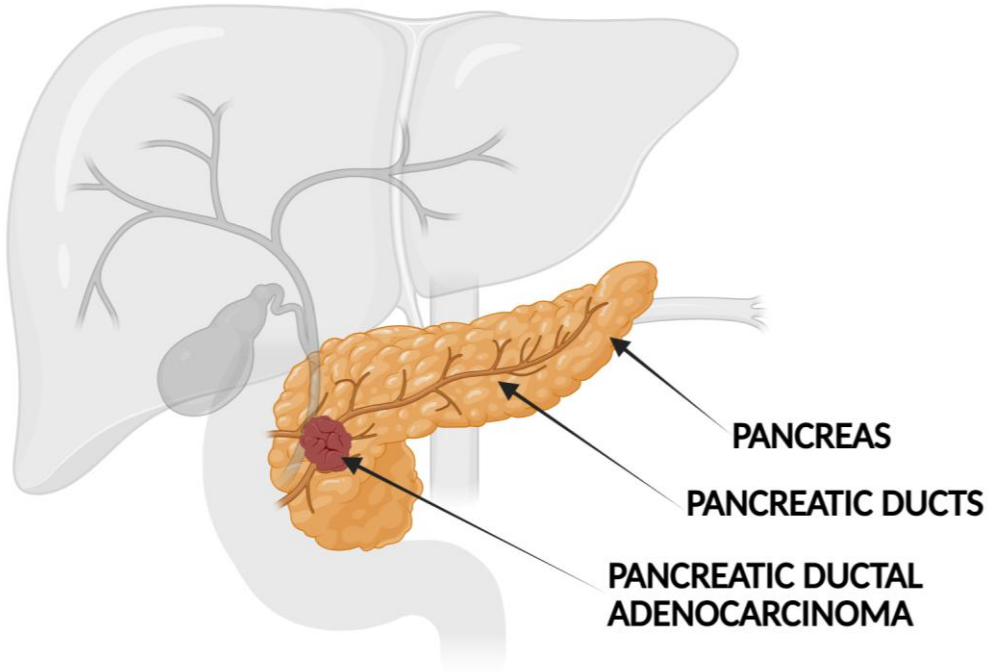
Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

Tumor like ecosystem: innovative approach

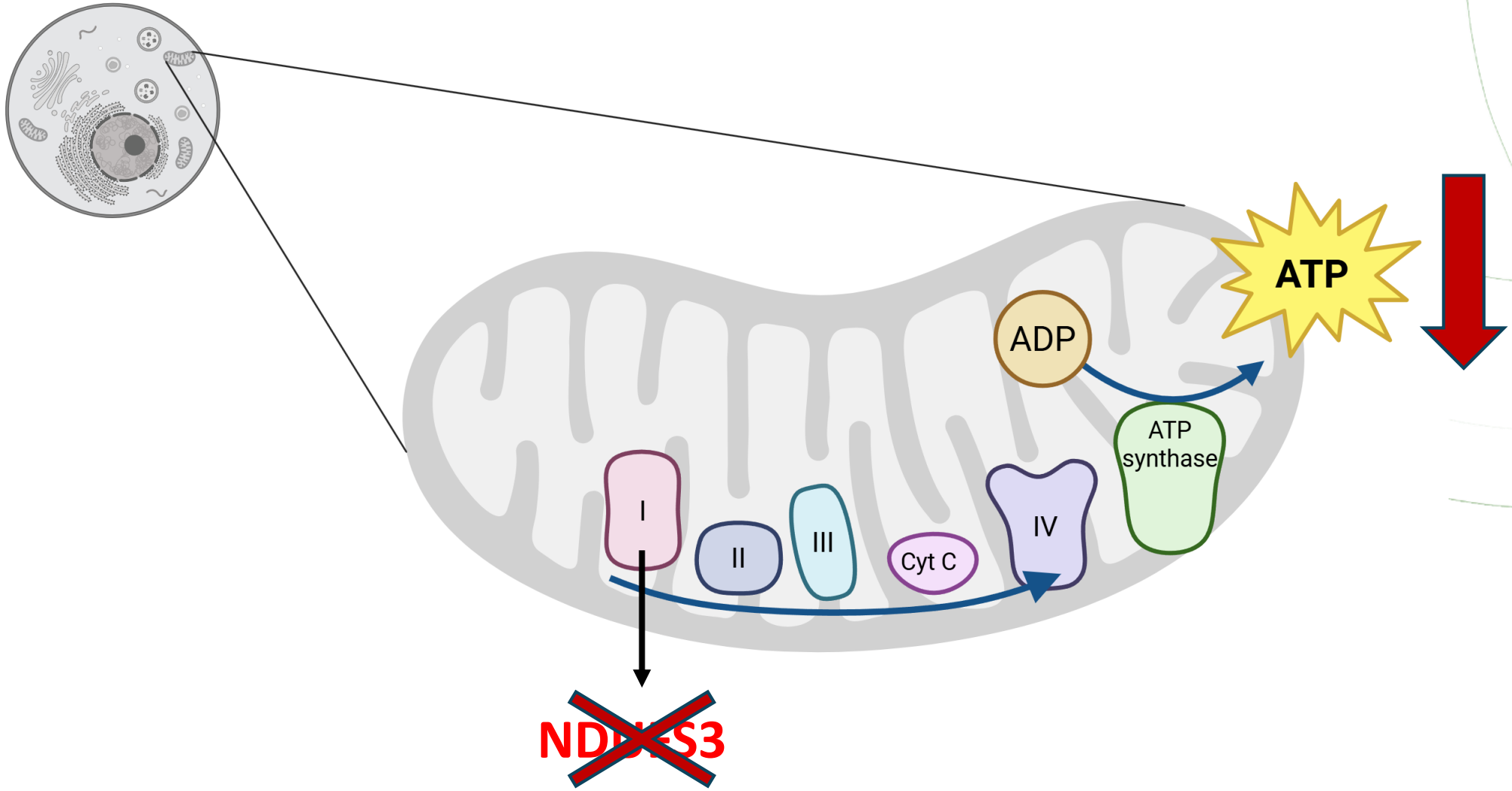


Ductal pancreatic adenocarcinoma: general characteristics

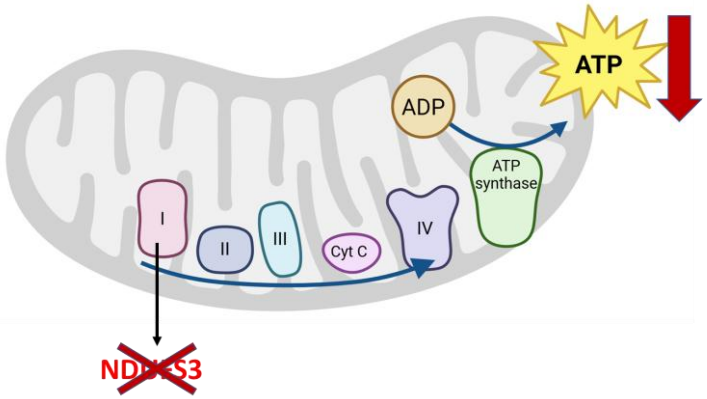
- **The most common pancreatic tumor**, accounting for 90% of cases
- **Increasing incidence**
- **Risk factors**: smoking, diabetes, chronic pancreatitis, genetic predisposition, diet, and obesity
- **Late diagnosis**
- **Poor prognosis**, with a 5-year survival rate of less than 13%

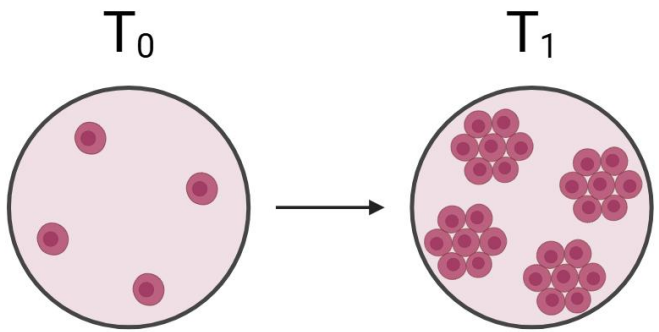


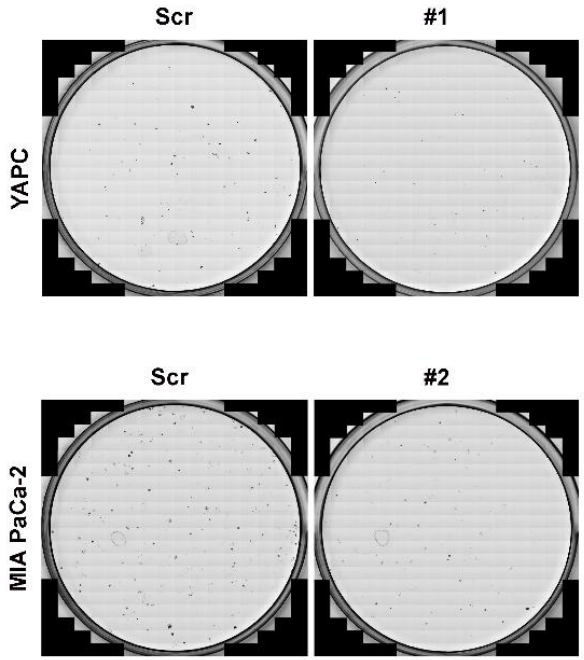
The mitochondrion: the cell's energy center

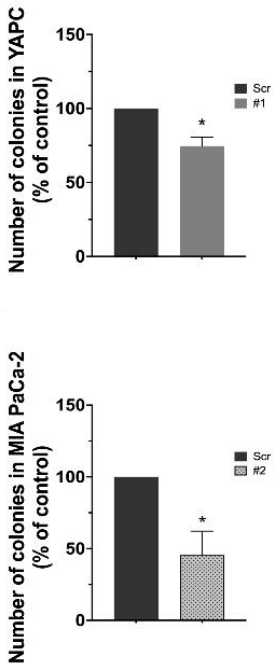


Mitochondrial dysfunction: reduced proliferation



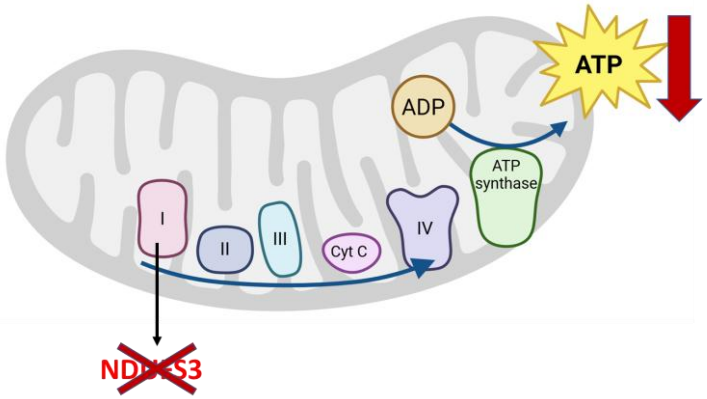


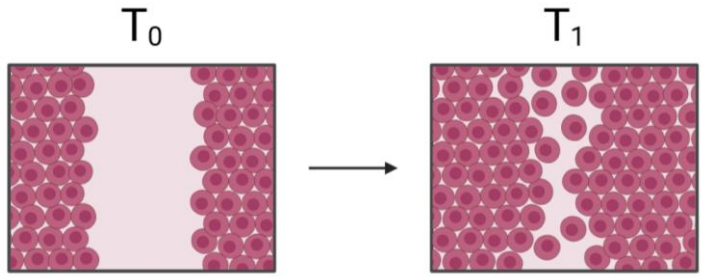


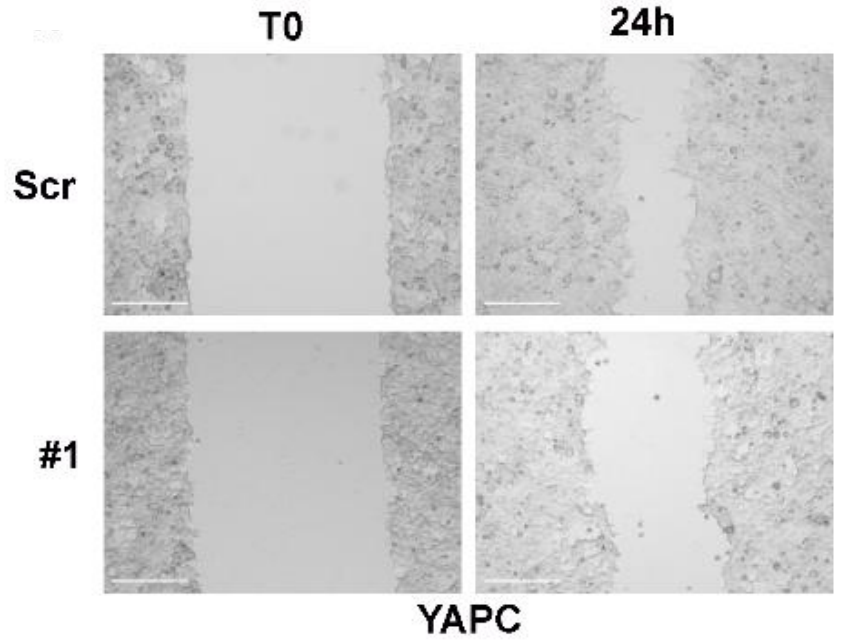


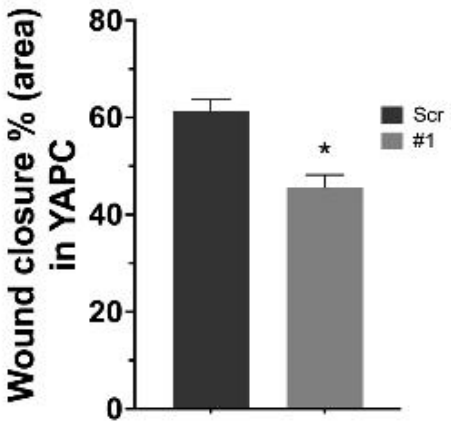
Proliferation

Mitochondrial dysfunction: reduced migration



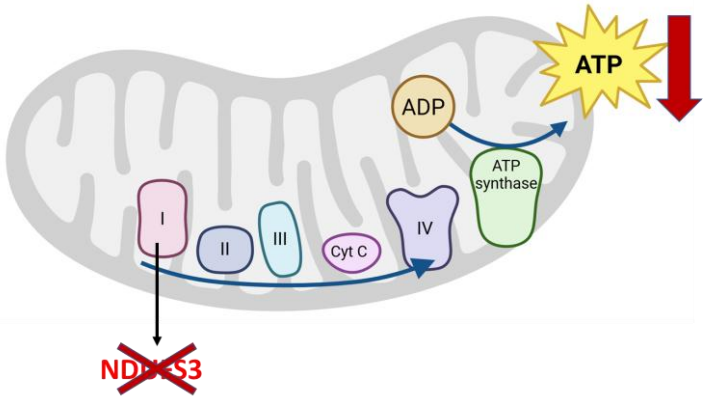


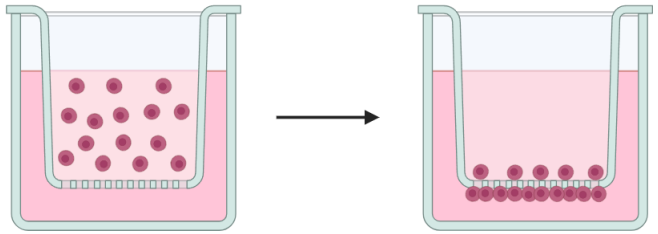




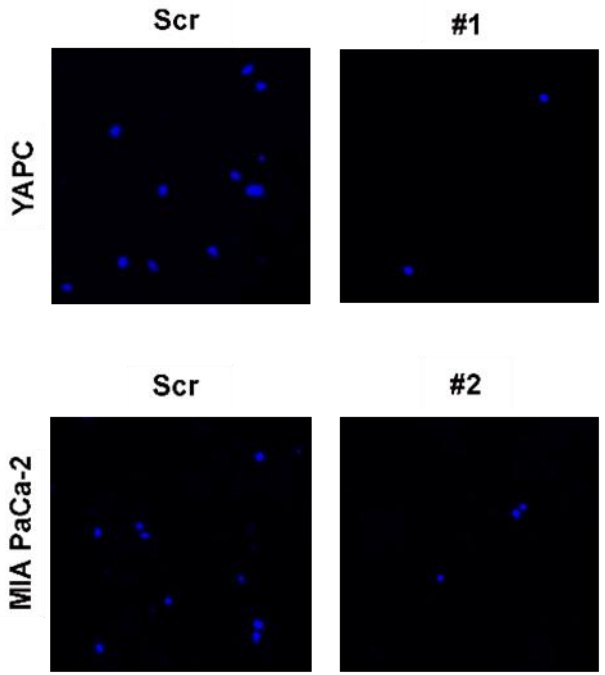
Migration

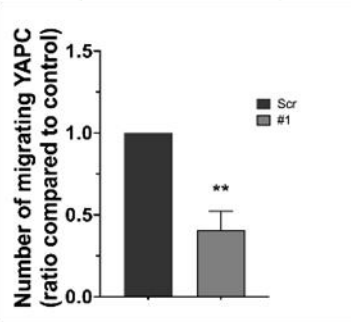
Mitochondrial dysfunction: reduced invasion

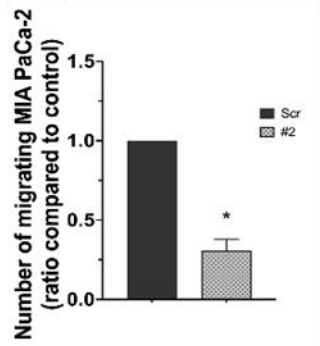




T_0 T_1

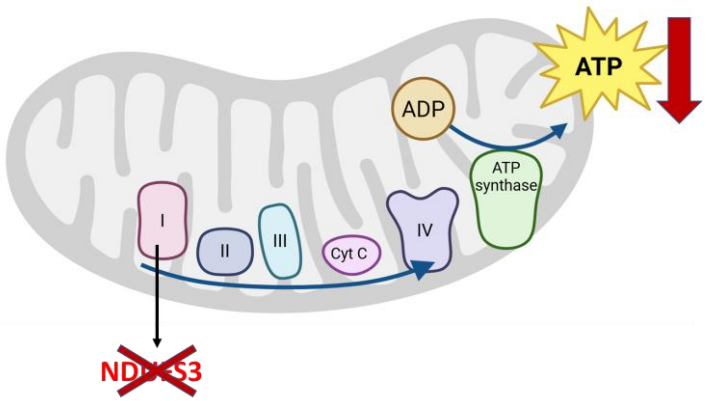






Invasion

Mitochondrial dysfunction: an ecological perspective



Less energy → Redistridution of resources → Reduced investment in invasion/survival

Recource allocation Theory

Less energy → Lower ecological fitness → Less competitive cells

Performance Theory

Mitochondrial dysfunction: main conclusions

- Mitochondrial dysfunction **reduces proliferation, migration, and invasion**
- Energetic impairment leads to **lower ecological fitness**
- Ecological theories help explain **cancer cell behavior**
- Targeting mitochondrial metabolism may **limit tumor progression**

THANKS!

Email of communicating
grazia.bramato@unisalento.it

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 “Education and Research” - Component 2: “From research to business” - Investment 3.1: “Fund for the realisation of an integrated system of research and innovation infrastructures”

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani