

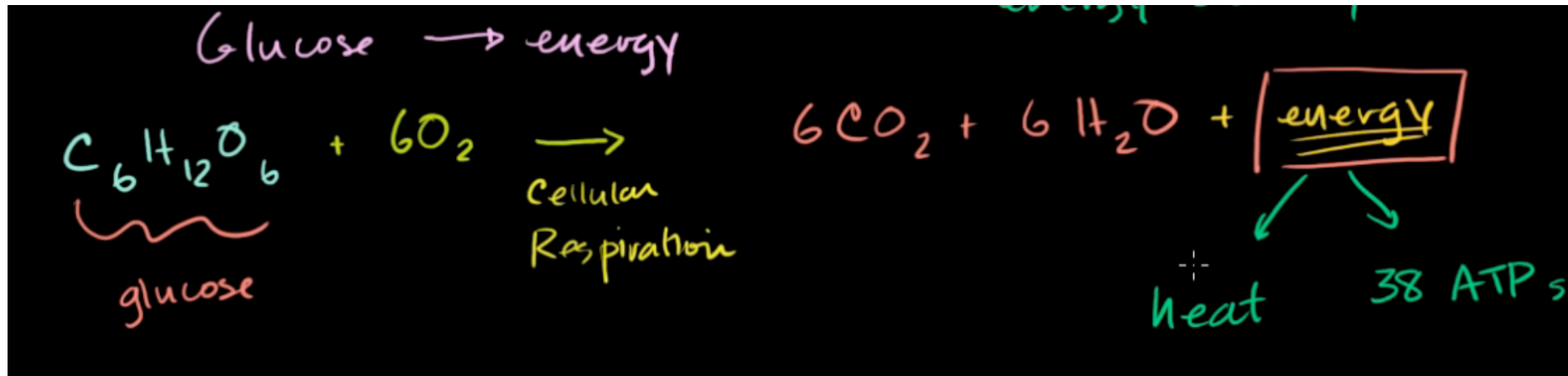
Preservación ex-situ, hipotérmica o(y) normotérmica

Ernest Hidalgo

Disclosure : none



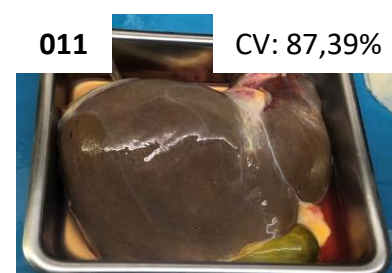
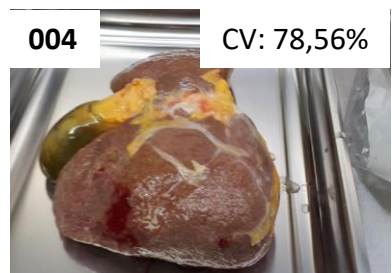
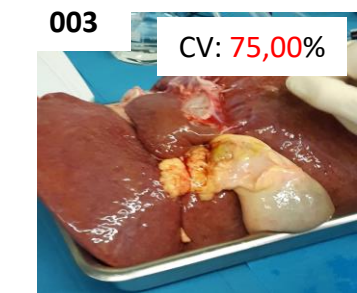
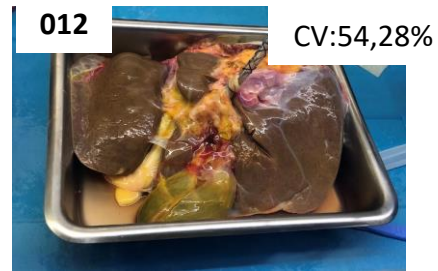
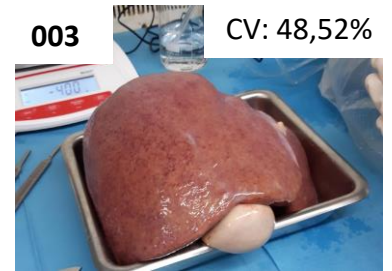
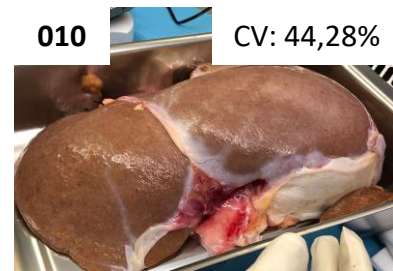
Cellular Homeostasis....



1. Anoxia
2. Anaerobic Glycolysis (2 ATPs)
3. Oxidative stress
4. Apoptosis
5. IRI



*Validity
Preservation*



CV: Cell Viability



1. Static cold storage

1. Dynamic Machine perfusion:

1. In-situ: NRP

2. Ex-situ:

1. Normothermia

2. Hypothermia OR HOPE

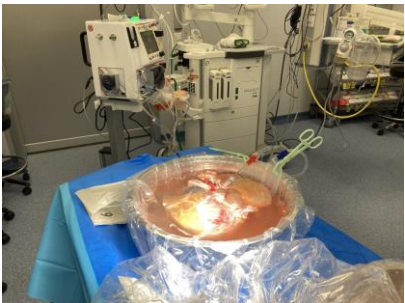
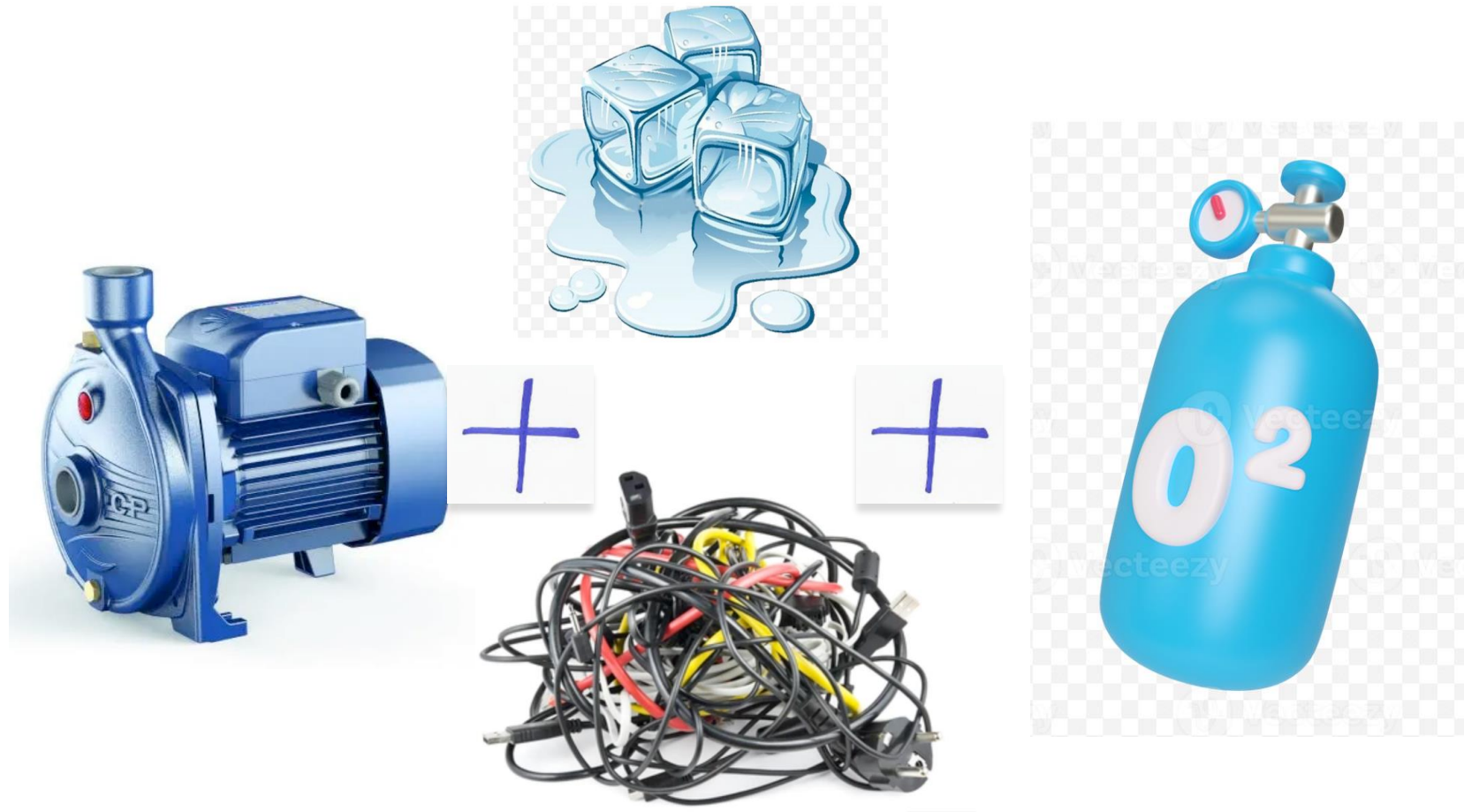
3. Combination of...



- What is it ?
- How does it work ?
- Why ?
- Really ?
- What does it bring ?

- **What is it ?**

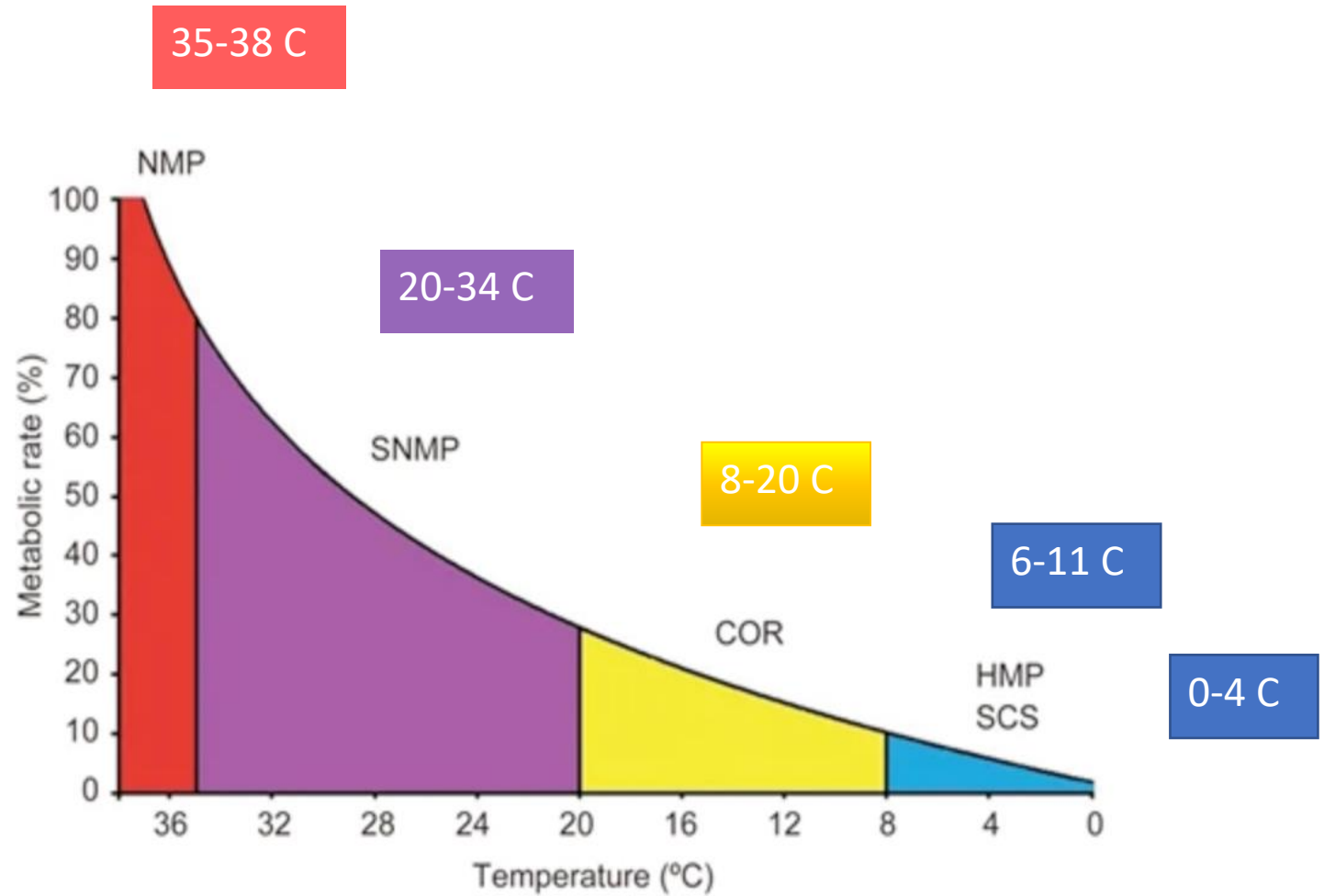
- How does it work ?
- Why ?
- How does it work ?
- Really ?
- What does it bring ?



- What is it ?
- **How does it work ?**
- Why ?
- Really ?
- What does it bring ?

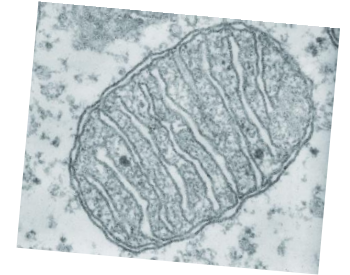
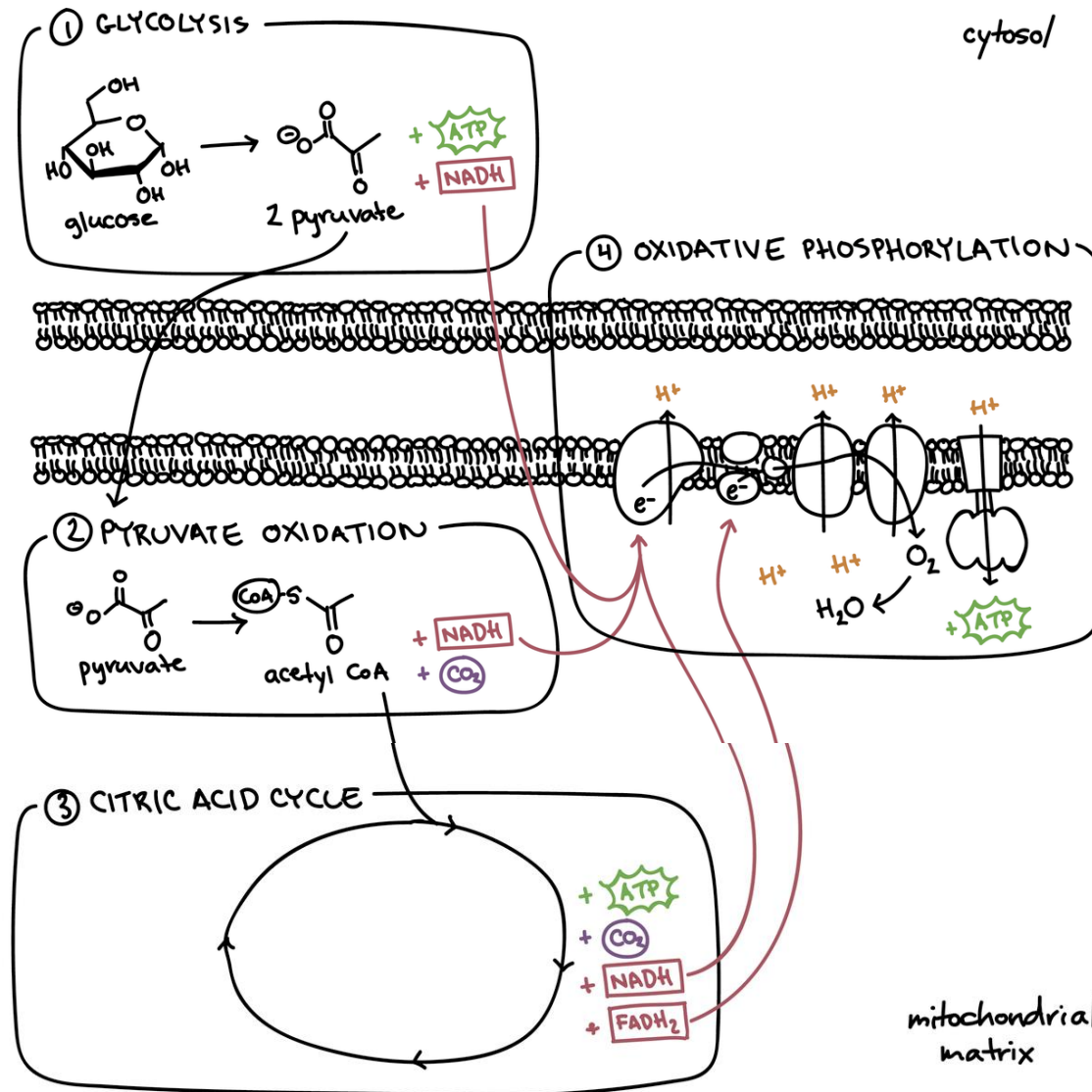
1.- Hypothermia
2.- Provides O₂

- What is it ?
- **How does it work ?**
- Why ?
- Really ?
- What does it bring ?



- What is it ?
- **How does it work ?**
- Why ?
- Really ?
- What does it bring ?

1. Aerobic glycolysis
2. Krebs cycle
3. ETC



when HOPE ?

- *IF balance waiting list / number of transplants is*

- “not a problem “: Standard Quality Organs



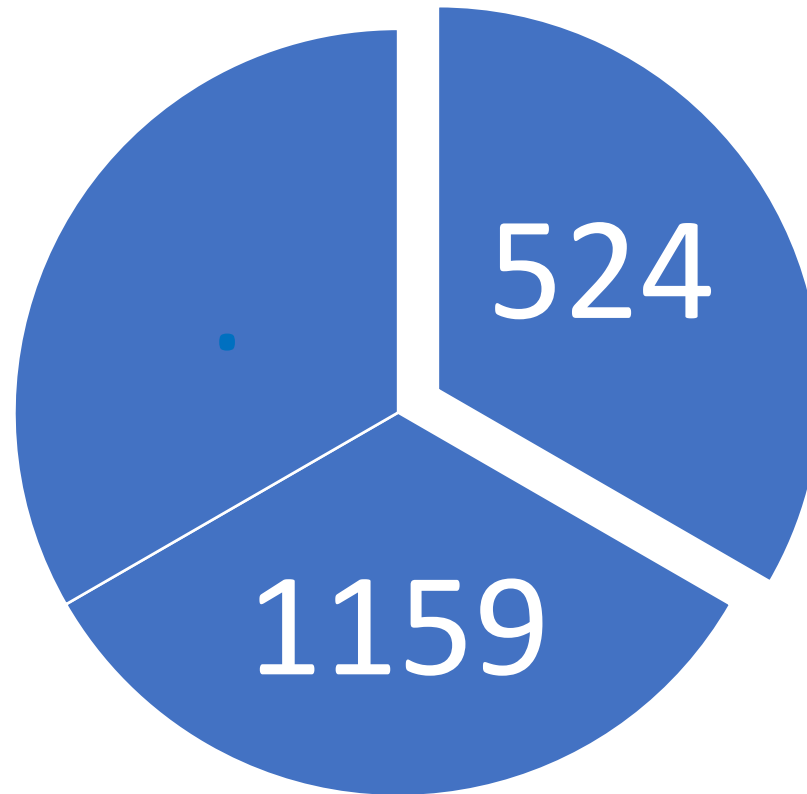
- a “problem” : Extended Criteria Organs



Actividad de donación y trasplante España 2022




Hígados de donantes eficazes
utilizados



Hígados de donantes eficazes
no utilizados

Benchmark results / Textbook Outcome

- Standard Quality Organs :
- Extended Criteria Organs :
 - ✓ DCD
 - ✓ Steatosis



	N	IC incidence (median)	graft loss % (median)
BDB	59706	1,05	10%
DCD NRP all	944	2,00	9,00
DCD-NRP+HOPE	112	1,50	9,25
DCD-HOPE	271	6,00	12,50
DCD benchmark	1012	8,80	12,7
DCD SRR all	2478	11,50	22,00

- What is it ?
- How does it work ?
- **Why ?**
- Really ?
- What does it bring ?

HOPE vs SCS

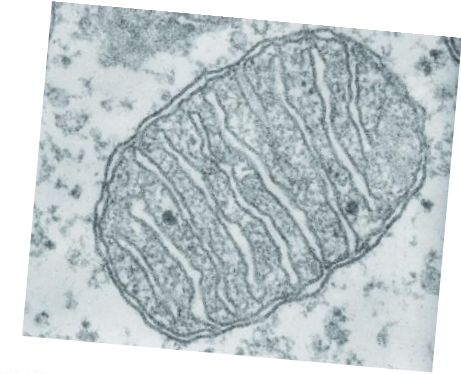
1. Improve clinical outcomes ?

- reducing IRI

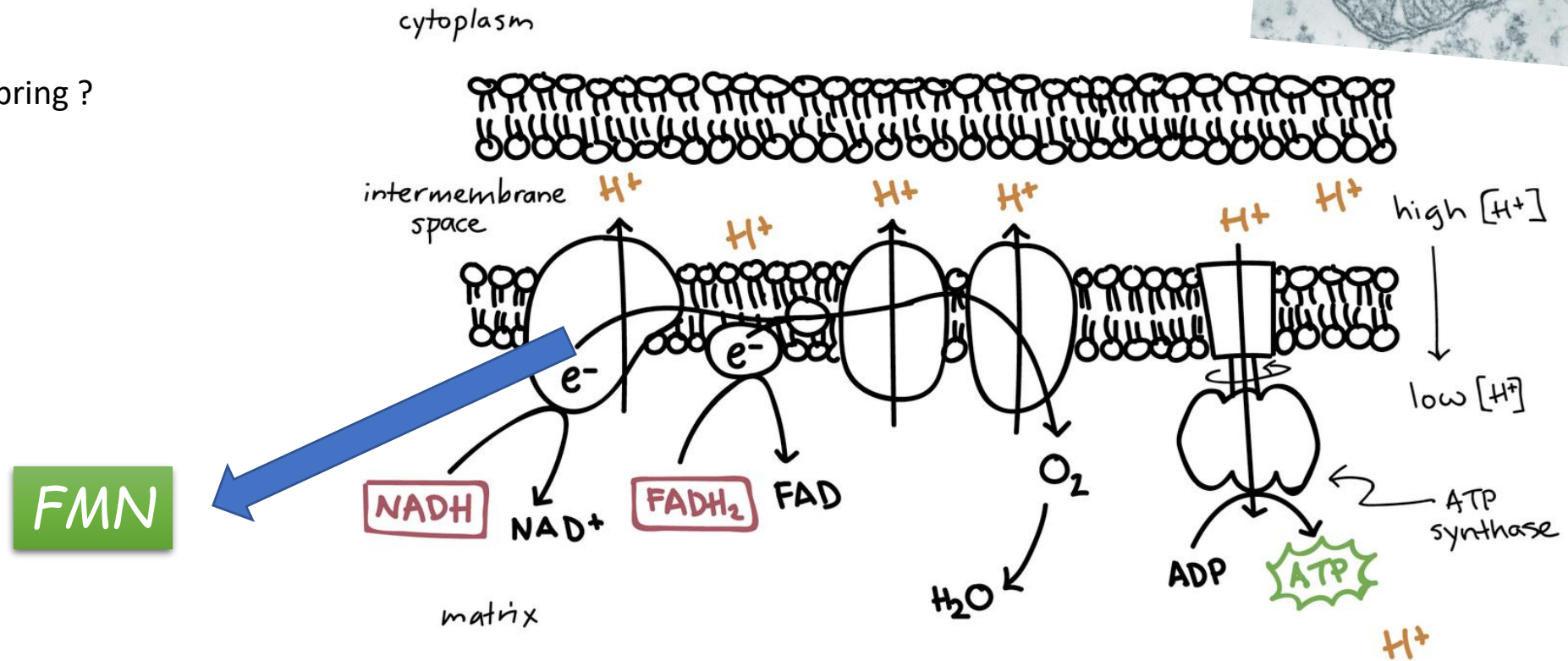
1. Improve organ pool utilization ?

- reducing discard rates
- Viability testing ?

- What is it ?
- **How does it work ?**
- Why ?
- Really ?
- What does it bring ?



Oxydative phosphorylation



A systematic review and meta-analyses of regional perfusion in donation after circulatory death solid organ transplantation



Julie De Beule^{1,*}, Katrien Vandendriessche^{2,*}, Liset H. M. Pengel³, Maria Irene Bellini⁴, John H. Dark⁵, Amelia J. Hessheimer⁶, Hendrikus J. A. N. Kimenai⁷, Simon R. Knight^{3,8}, Arne P. Neyrind^{9,10}, David Paredes¹¹, Christopher J. E. Watson^{12,13}, Filip Rega^{2,14} & Ina Jochmans^{1,15}

Machine Perfusions in Liver Transplantation: The Evidence-Based Position Paper of the Italian Society of Organ and Tissue Transplantation

Davide Ghinolfi¹, Quirino Lai², Daniele Dondossola³, Riccardo De Carlis⁴, Marinella Zanierato⁵, Damiano Patrono⁶, Stefano Baroni⁷, Domenico Passi⁸, Fabio Ferla⁴, Andrea Lauterio⁴, Chiara Lazzeri⁹, Paolo Magistri¹⁰, Fabio Mandrolini¹¹, Daniele Pezzati¹, Matteo Ravaioli¹², Erion Rreka¹, Luca Toti¹³, Alberto Zanella¹⁴, Patrizia Burra¹⁵, Salvatore Petta¹⁶, Massimo Rossi², Philippe Dutkowski¹⁷, Wayel Jaarem¹⁸, Paolo Muijsan¹⁹, Cristiano Quintini²⁰, Markus Selzner²¹ and Umberto Cillo⁸

- ❖ Systematic Reviews
- ❖ Meta-analysis
- ❖ Observational comparatives
- ❖ and non-comparative studies
- ❖ Estudios controlados

Liver transplant outcomes after perfusion: a meta-analysis

Belle Liew¹, David Nasralla^{1,2}, Satheesh Iype^{1,2}, Joerg-Matthias Pollok^{1,2}, Brian Davidson^{1,2} and Dimitri A. Raptis^{1,2,*}

¹Division of Surgery & Interventional Science, University College London, London, UK
²Department of HPB Surgery and Liver Transplant, Royal Free NHS Foundation Trust, London, UK

*Correspondence to: Royal Free NHS Foundation Trust and University College London, London NW3 2QG, UK (e-mail: dimitri.raptis@nhs.net)

Machine Perfusion in Liver Transplantation: A Systematic Review and Meta-Analysis

Matas Jakubauskas^{a,b}, Lina Jakubauskiene^{a,b}, Bettina Leber^a, Kestutis Strupas^b, Philipp Stiegler^a, Peter Schemmer^a

^aGeneral, Visceral and Transplant Surgery, Department of Surgery, Medical University of Graz, Graz, Austria;
^bFaculty of Medicine, Vilnius University, Vilnius, Lithuania

A Systematic Review and Meta-Analysis of Machine Perfusion vs. Static Cold Storage of Liver Allografts on Liver Transplantation Outcomes: The Future Direction of Graft Preservation

Junjun Jia^{1,2*}, Yu Nie^{1,2*}, Jianhui Li^{1,2}, Haiyang Xie^{1,2}, Lin Zhou^{1,2}, Jun Yu^{1,2} and Shu-Sen Zheng^{1,2*}

Systematic Review of Normothermic and Hypothermic Machine Perfusion in Liver Transplantation

Joseph Mugaanyi^{1,2}, Lei Dai¹, Changjiang Lu¹, Shuqi Mao¹, Jing Huang^{1,*} and Caide Lu^{1,*}

¹ Department of Hepato-Pancreato-Biliary Surgery, Ningbo Medical Center Li Huili Hospital, The Affiliated Hospital of Ningbo University, Ningbo 315040, China
² School of Medicine, Ningbo University, Ningbo 315211, China
 * Correspondence: huangjingonline@163.com (J.H.); lucaide@nbu.edu.cn (C.L.)

- What is it ?
- How does it work ?
- Why ?
- **Really ?**
- What does it bring?

34 studies *ClinicalTrials.gov* con MP (2015)

- 11 HOPE (1514)
- 17 NMP (647)
- 0 NRP
- other (dynamic not oxygenated)

13 **RCT** (2218)

- 8 HOPE (1418)
- 5 NMP

HOPE

- What is it ?
- How does it work ?
- Why ?
- **Really ?**
- What does it bring?

<i>Target</i>	<i>design</i>		<i>n</i>	<i>Primary Outcome</i>
DBD	RCT. HOPE vs NMP		213	CCI
DBD*	RCT HOPE vs SCS		266	AED
DBD	RCT HOPE vs SCS		104	EAD
ECD-DBD	RCT HOPE vs SCS		46	EAD: ALT
DBD & DCD	RCT HOPE vs SCS		244	EAD
DCD	RCT HOPE vs SCS		157	NAS
DBD	RCT HOPE vs SCS		179	Clavien >3
DBD **	RCT, HOPE vs SCS		220	EAD

- What is it ?
- How does it work ?
- Why ?
- Really ?
- **What does it bring ?**

HOPE vs SCS

- Early Allograft dysfunction
- AST / ALT PEAK
- Post-reperfusion sd.
- PNF

- Lesser LOS
- Lesser UCI stay
- Lesser need for RRT
- Lesser incidence of IC
- Complications

GRADE

- Mod to high
- Mod
- Mod
- Low to Mod

- Low to Mod
- Low to Mod
- Low
- High (DCD)
- Low to Mod

- What is it ?
- How does it work ?
- Why ?
- Really ?
- **What does it bring ?**

HOPE vs SCS

1. Improve clinical outcomes

➤ reducing IRI

1. Improve organ pool utilization
 - reducing discard rates
 - Viability testing

- What is it ?
- How does it work ?
- Why ?
- Really ?
- **What does it bring?**

Scenarios to use HOPE

1. DCD high risk (+NRP)
2. Elderly DBD
3. when long CIT is predicted
4. with Validity intention ?
5. Grafts with severe steatosis ??????