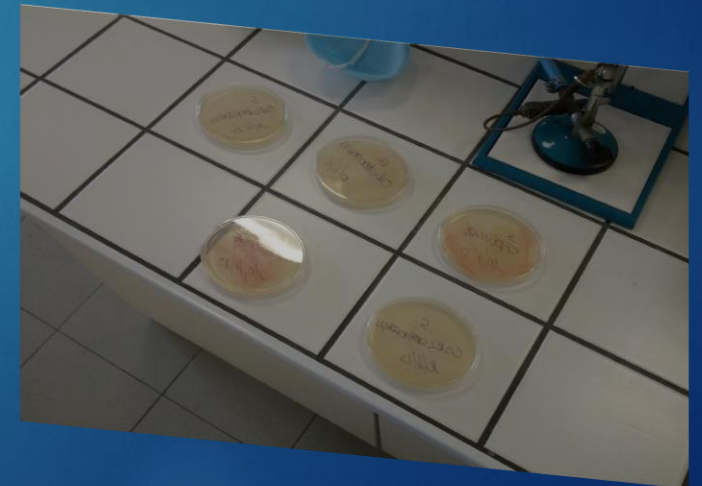


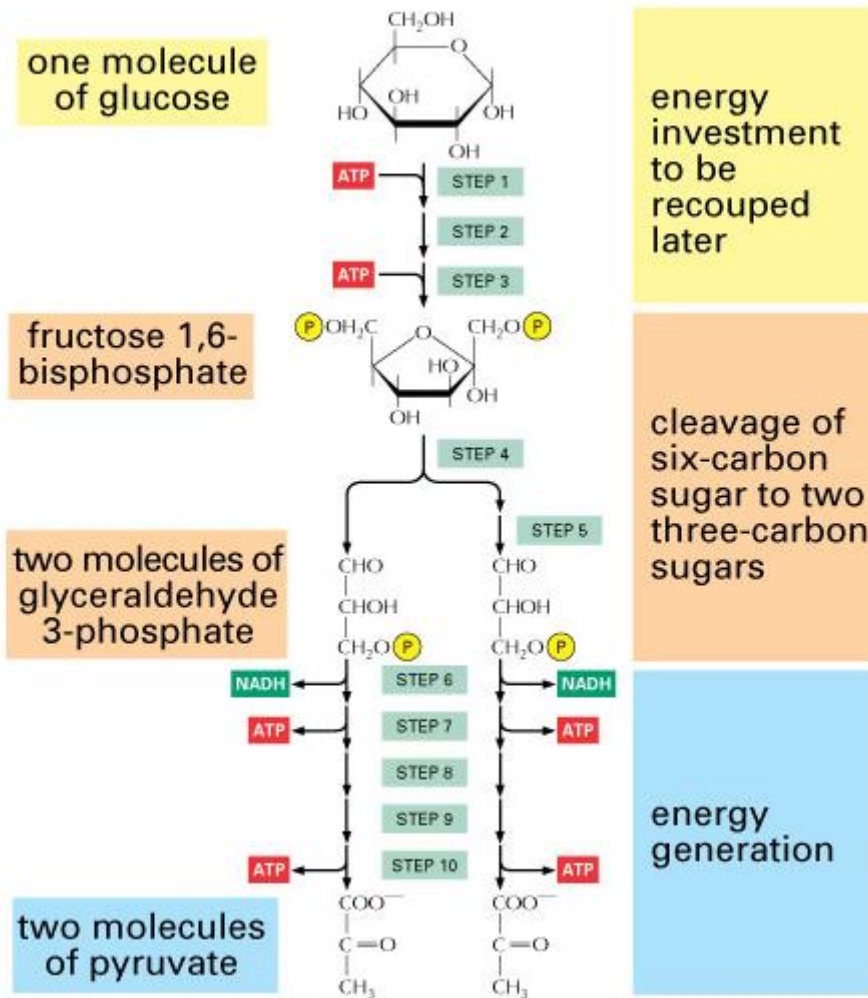
MFC – Microbial fuel cell

Matteo Giardino
ITIS Avogadro



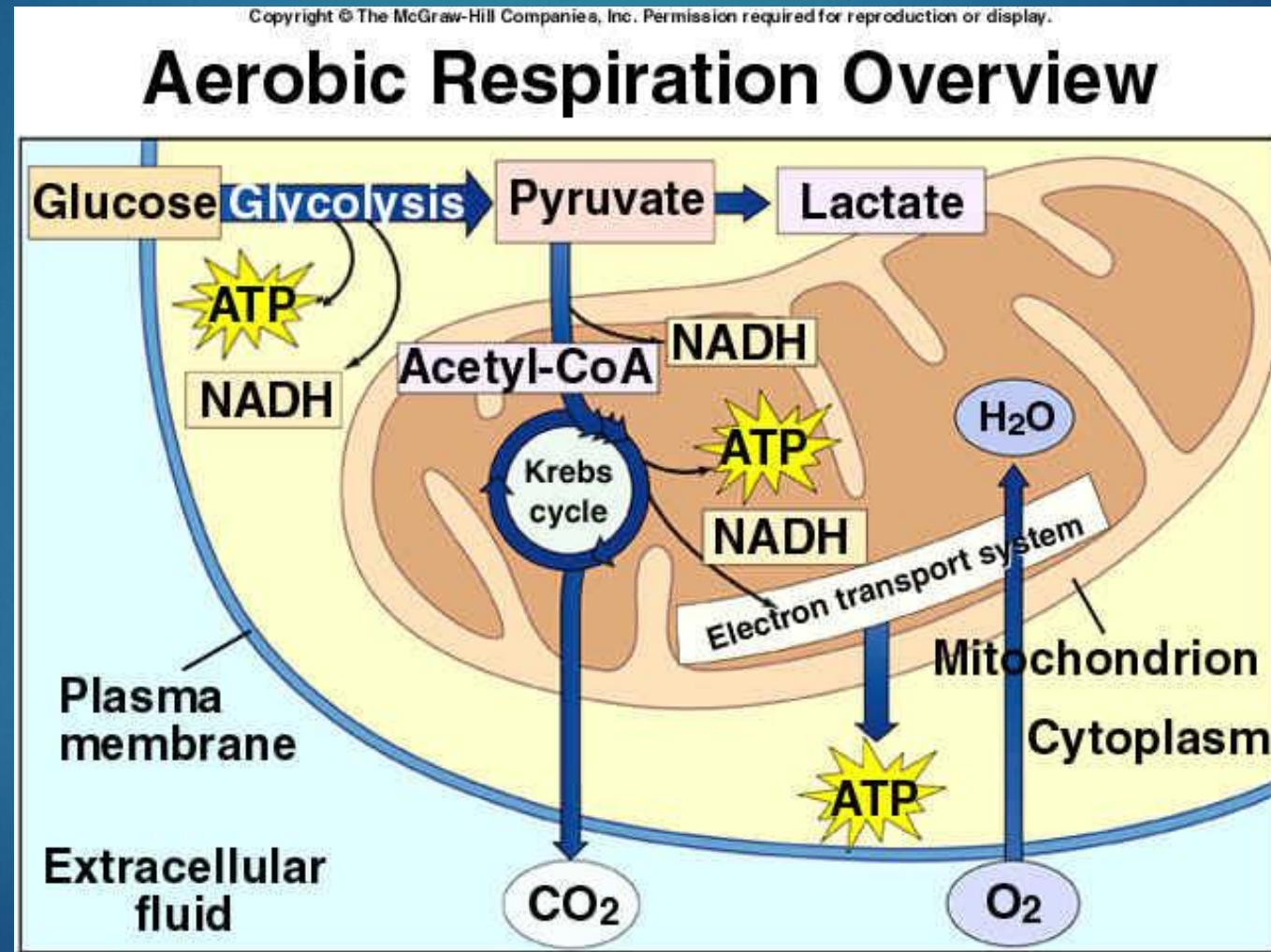
Glycolysis

2



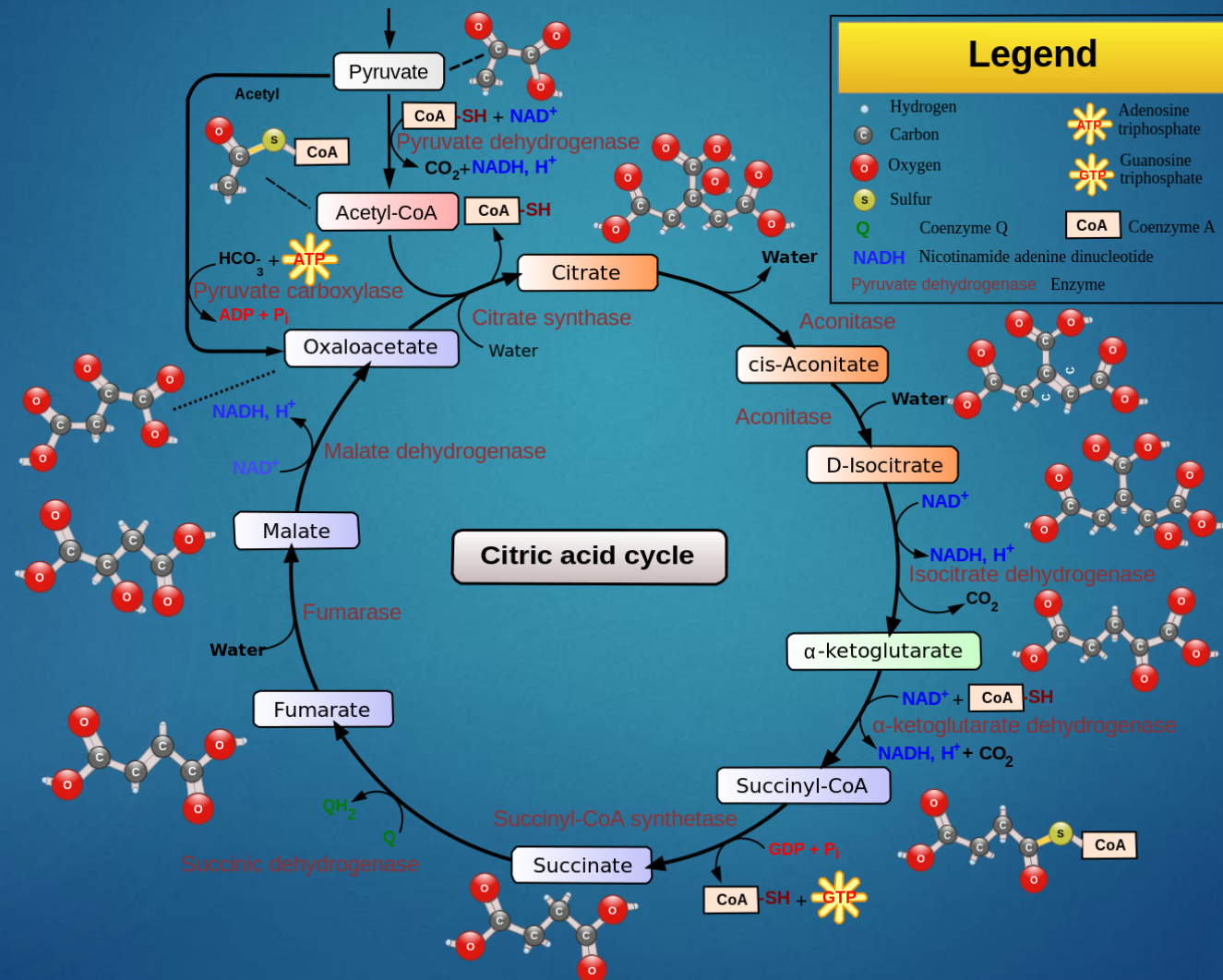
Cellular respiration

3



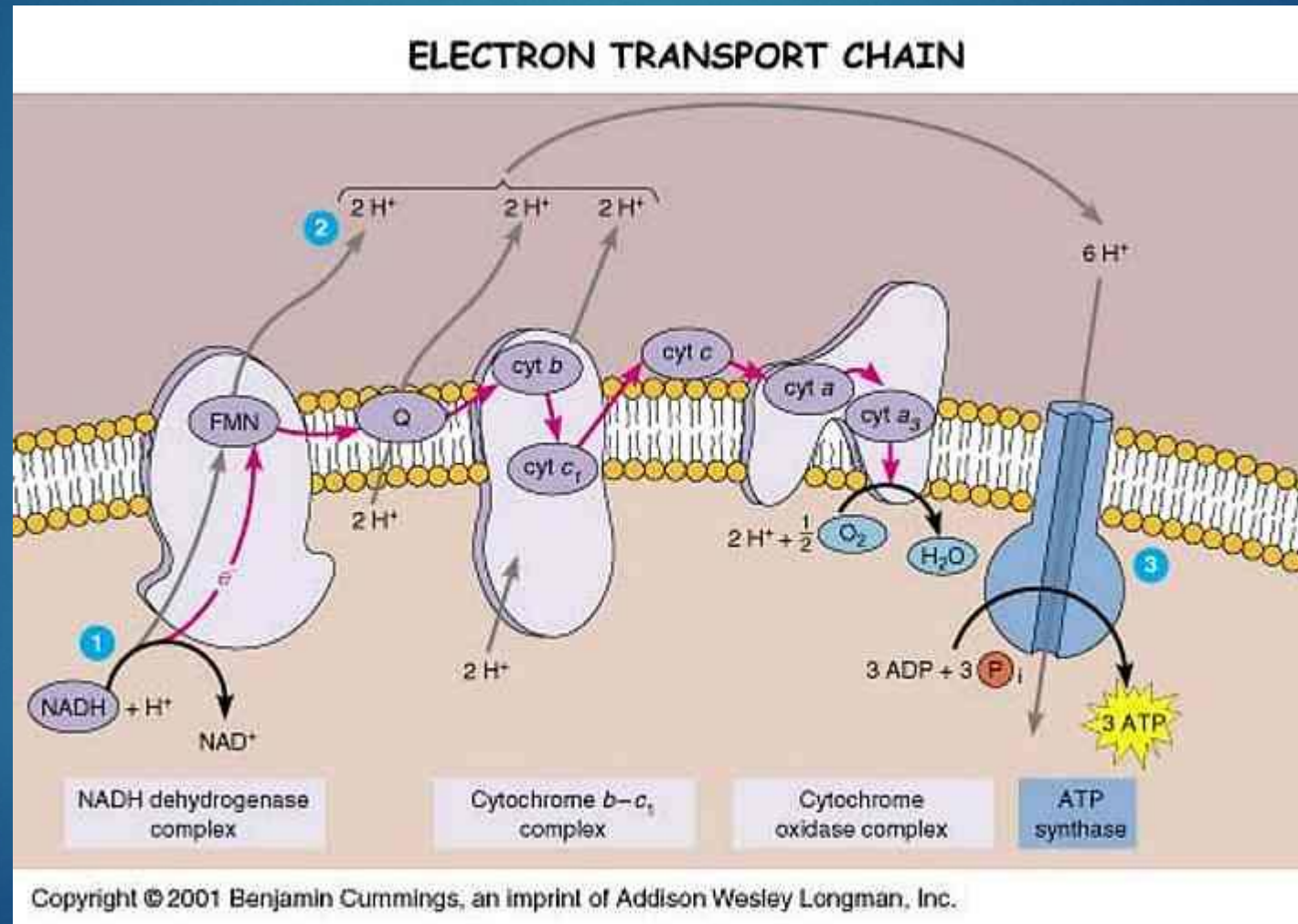
Kreb's cycle

4



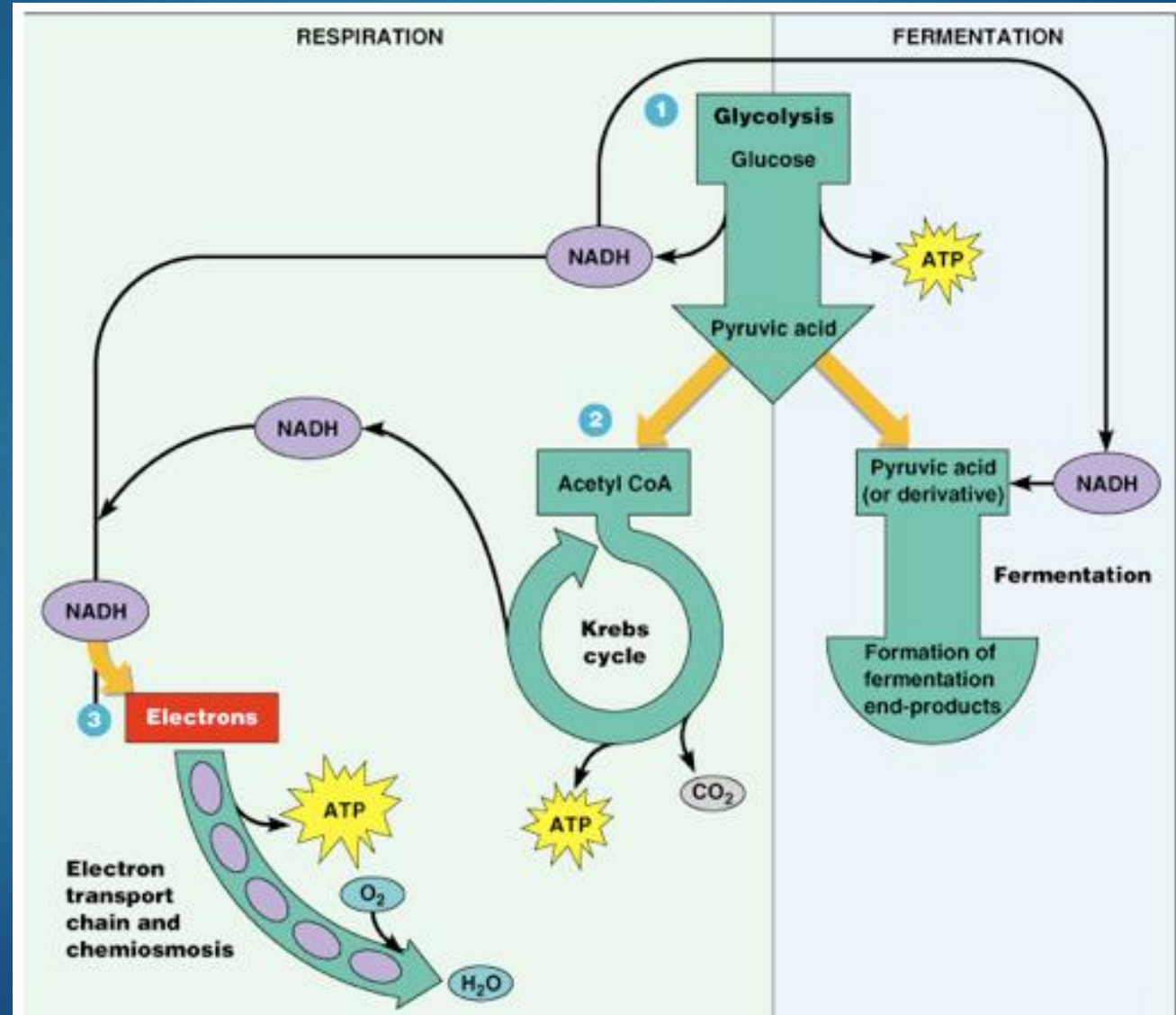
Electron transport system

5



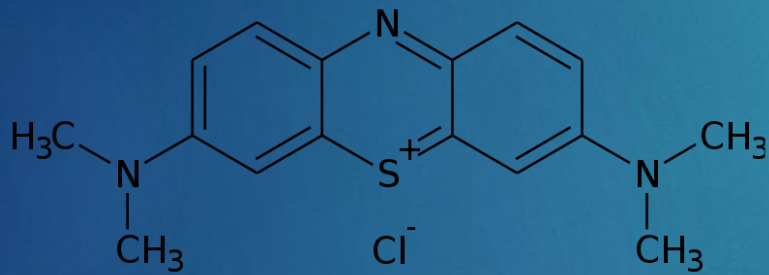
Fermentation

6



Let's start from a very simple experiment....

7

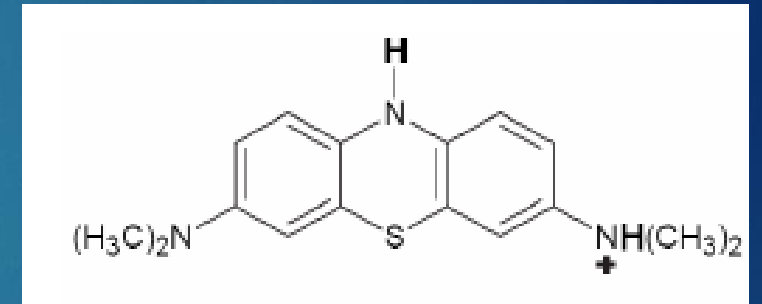


Methylene
Blue

+



S. Cerevisiae

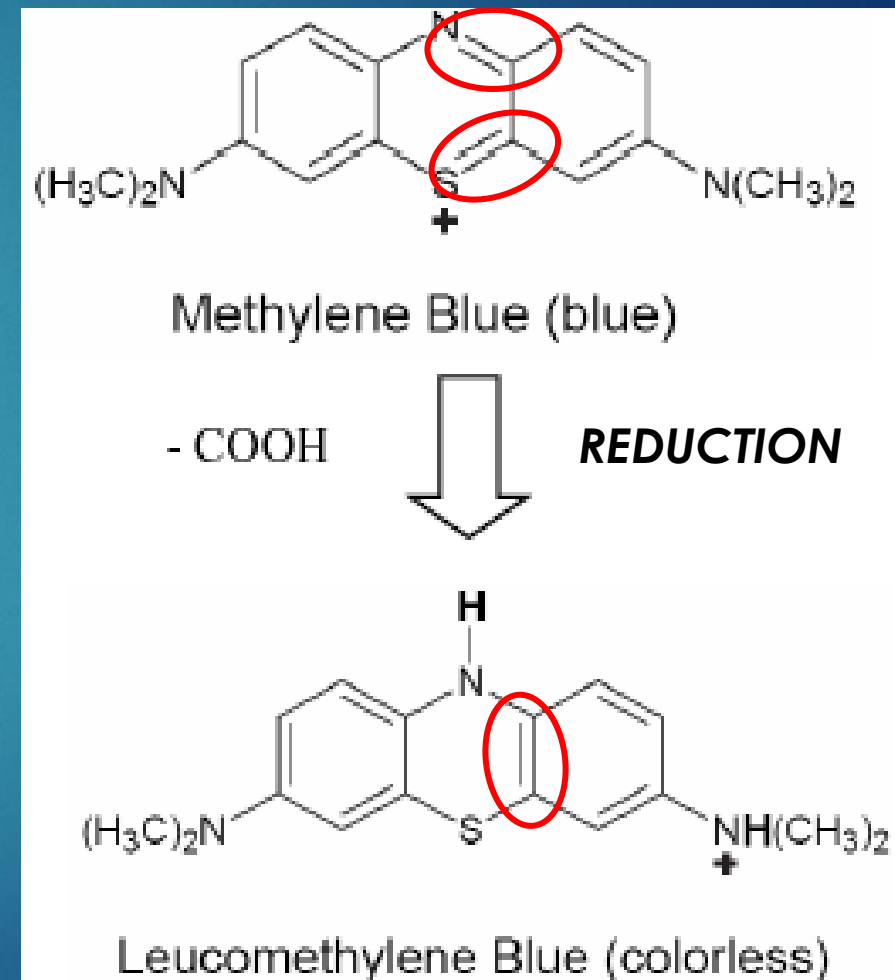


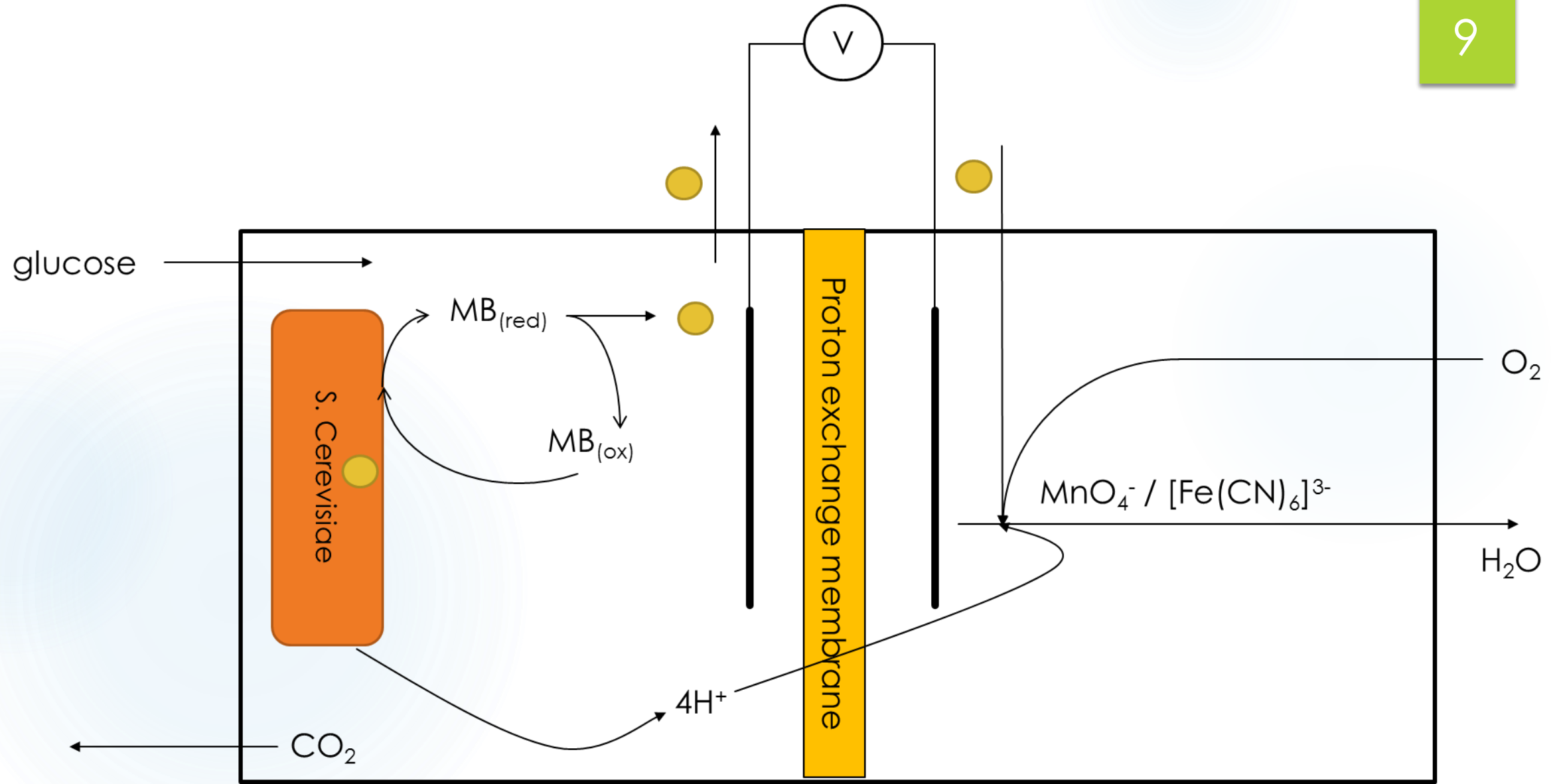
Leucomethylene
blue

What happened?

8

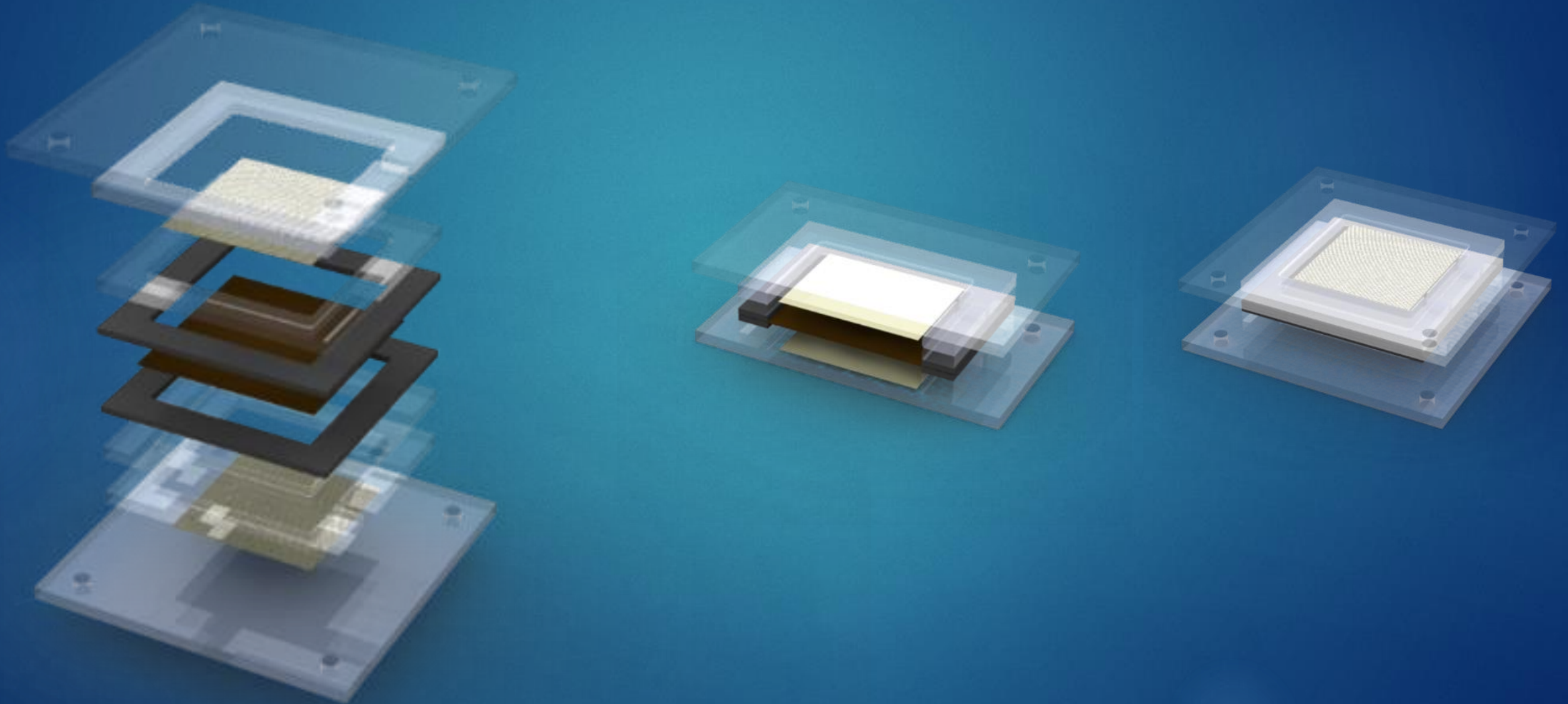
- ▶ **Methylene blue** was reduced to **Leucomethylene blue**.
- ▶ The Methylene blue solution is blue coloured but the Leucomethylene solution has no color.
- ▶ Methylene blue was reduced by acquiring hydrogen atoms which were removed from glucose molecules during the respiratory chain.

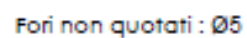
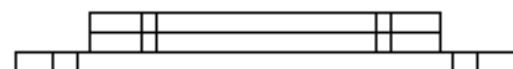




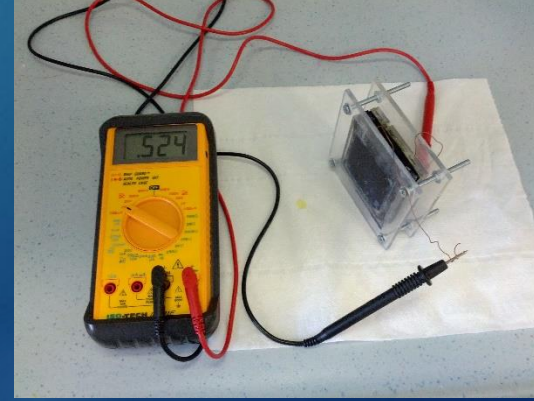
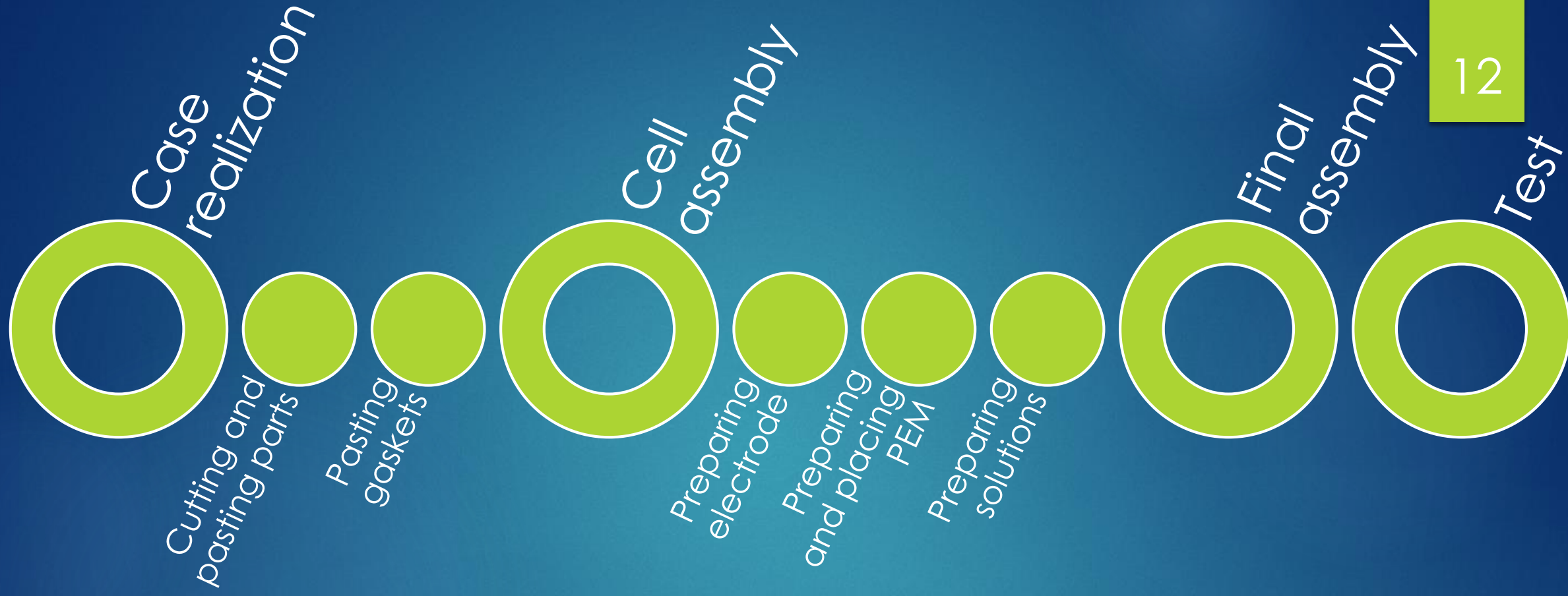
A prototype to study MFCs


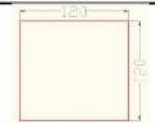
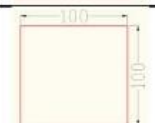
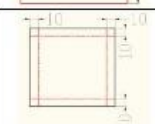
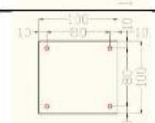
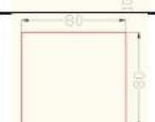
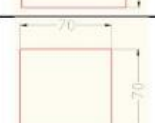
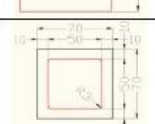
10

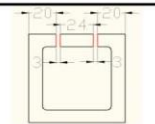
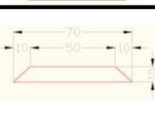
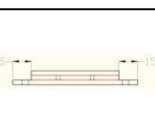
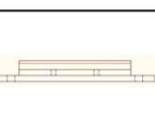
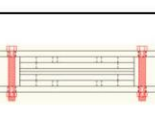


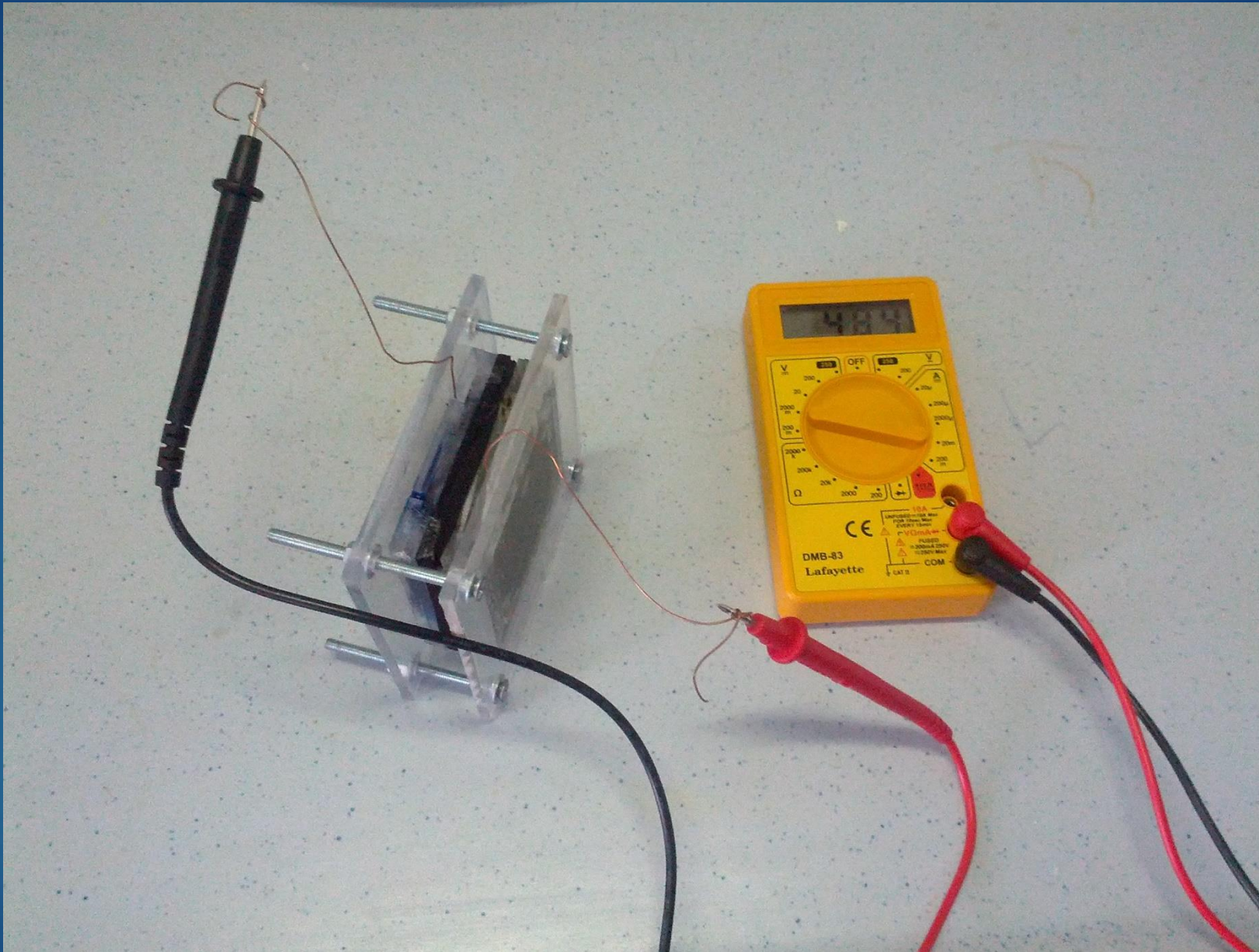


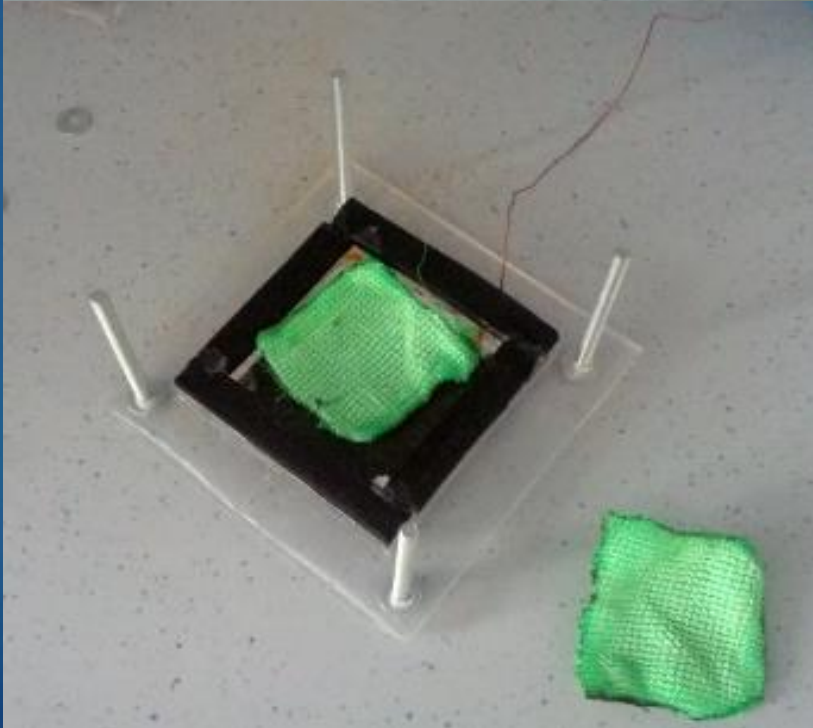
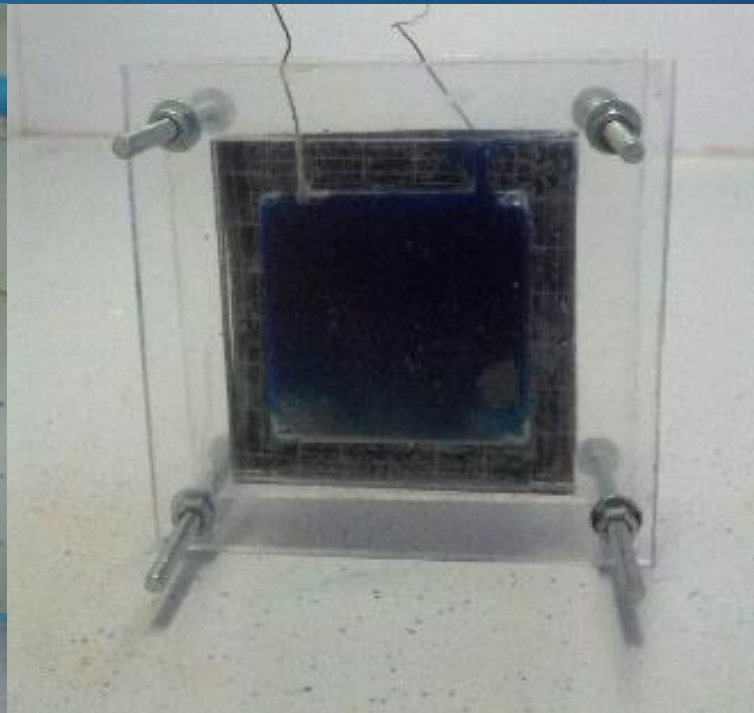
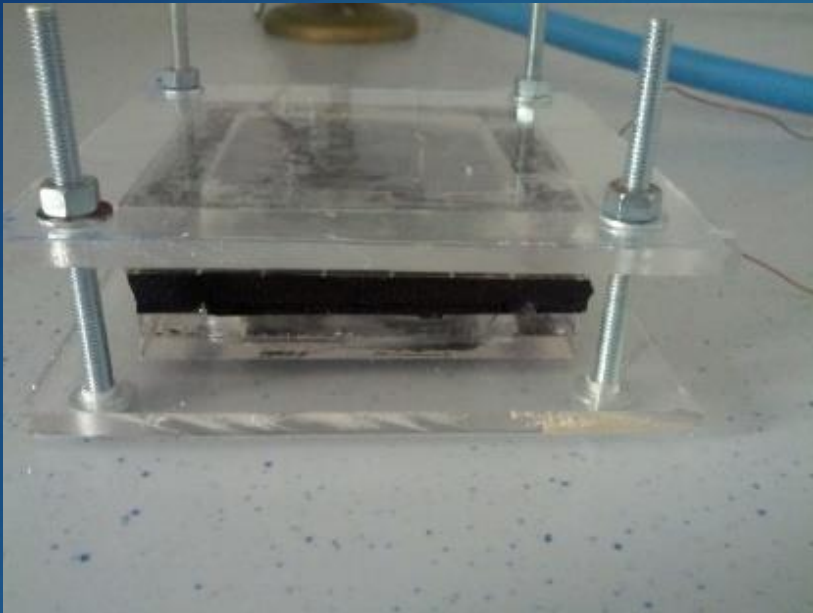
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH		DIMS AND SMALL SHARP NOTES		DO NOT SCALE DRAWING		REVISION: 00/0/2014	
	NAME	SIGNATURE	DATE			TITLE:			
DRAWN	Melissa Chaudoin		00/0/2014			Fuel cell case side			
CHECKED	Melissa Chaudoin		00/0/2014						
APPROVED	Melissa Chaudoin		00/0/2014						
WFO									
G.A.				MATERIAL:		DWG NO.		1 of 3	A3
				PMMA					
				WEIGHT:		SCALE(S)		SHEET 1 OF 1	



Matteo Giardino, Giulio Lovo					I.I.S. Galilei-Ferrari					pg.: 2		
STEP N°	OPERATIONS DESCRIPTION	DRAFT	MACHINE	TOOLS and EQUIPMENTS	V_c (m/min)	n (rpm)	a (mm/round)	np	pp (mm)	shaving section q (mm ²)	V_a (mm/min)	time (min)
10	Part check-in test: dimension 250x300 and absence of cracks		Workbench	1/20 gauge	-	-	-	-	-	-	-	3
20	Running cut from 250x300 to 120x120 for 2 parts		Band saw	1/20 gauge				1	4	-	manual	4
30	Running contouring from 120x120 to 100x100 for 2 parts		CNC Miller	1/20 gauge	50	5000	0.06	4	1	0.06	100	32
40	Running tracing out hole axis		Height gauge, punch	-	-	-	-	-	-	-	-	3
50	Running hole for 2 parts with $\varnothing=5$		Boring machine	1/20 gauge	40	2500	manual	1	4	-	-	6
60	Running cut from 250x300 to 80x80 for 4 parts		Band saw	1/20 gauge				1	4	-	manual	6
70	Running contouring from 80x80 to 70x70 for 4 parts		CNC Miller	1/20 gauge	50	5000	0.06	4	1	0.06	100	45
80	Running 50x50 eyelet cut for 4 parts		CNC Miller	1/20 gauge	50	5000	0.06	4	1	0.06	100	32

Matteo Giardino, Giulio Lovo					I.I.S. Galilei-Ferrari					pg.: 3		
STEP N°	OPERATIONS DESCRIPTION	DRAFT	MACHINE	TOOLS and EQUIPMENTS	V_t (m/min)	n (gir/min)	a (mm/giro)	np	pp (mm)	sez truciolo q mm ²	V_a (m/min)	time (min)
90	Running 3x10 border cut for 2 parts		CNC Miller	1/20 gauge	50	5000	0.06	4	1	0.06	100	1
100	Running gaskets cut for 8 parts		Work bench	1/20 gauge	-	-	-	-	-	-	-	4
110	Running pasting parts with CH ₂ Cl ₂ (for 2 parts)		Work bench	1/20 gauge	-	-	-	-	-	-	-	20
120	Running pasting gaskets with epoxy glue		Work bench	1/20 gauge	-	-	-	-	-	-	-	30
130	Assembling the device		Work bench	1/20 gauge	-	-	-	-	-	-	-	4





THANK YOU FOR YOU ATTENTION!



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