



Precellys Evolution

教育訓練

Bertin Precellys Evolution 系統介紹與應用
Precellys Multi-Tissue Dissociation Kit

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均泰生物科技股份有限公司
Genetech Biotech Co., Ltd.



Agenda

- **Introduction of Precellys Evolution**

- **Application**

 - **Nucleic Acid Extraction /Protein Extraction**

 - **Other**

- **Introduction of Precellys Multi-Tissue Dissociation Kit**

- **Q&A**

Bertin Technologies

- 為法國CNIM集團旗下子公司，致力於為全球市場提供創新的測量及取樣技術，主要產品包含環境輻射/氣體監控系統、樣品均質機、空氣取樣器等，合作夥伴遍佈全球。



高效研磨均質

各式動/植物軟、硬組織研磨、細胞裂解



標準化組織細胞解離

多來源組織樣品的細胞培養、單細胞分析



多元生物標記檢測

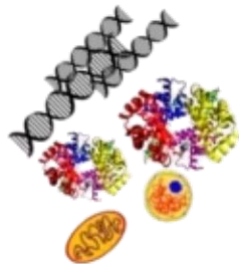
單/多株抗體、臨床樣品收集管、ELISA檢測、佐劑及抗原乳化



超輕鬆空氣微粒採樣

環境監測與下游多元分析應用(PCR、NGS、微生物培養等)

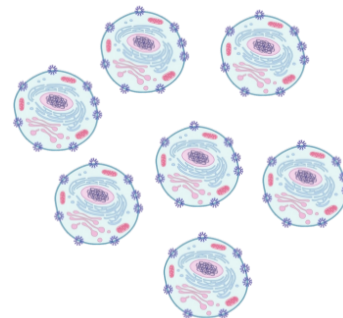
Homogenization



- **Free molecules**
(proteins, hormones, small molecules etc. ..)
- **Nucleic acids**
(DNA/RNA)



Dissociation



- **Living Single Cell**

Traditional Sample Preparation Methods

1. Sonicator

- **Principle:** Micro-bubbles crush samples.
- **Best for:** Liquid-phase samples, microorganisms.
- **Not for:** Plant, animal, human tissues, hard samples.
- **Pain points:** Requires cleaning, poor reproducibility.



2. Mortar & Pestle

- **Principle:** Manual grinding.
- **Best for:** Hard, frozen samples.
- **Not for:** Large or multiple samples.
- **Pain points:** Requires cleaning, poor reproducibility, low throughput.

Mortar & Pestle



3. Blade Mixer

- **Principle:** Rotating blades cut samples.
- **Best for:** Hard, tough samples.
- **Not for:** Microorganisms.
- **Pain points:** Requires cleaning, low throughput

Blade mixer



BEAD-BEATING BENEFITS

- Disrupt any sample in ~30 sec
- Prepare multiple samples at once
- Standardization
- Cross-contamination Free

Precellys Workflow



1 - **Prepare** your lysing tube and add your sample



2 - **Process** with **Precellys** instrument (between 30s and 3min depending on the sample)

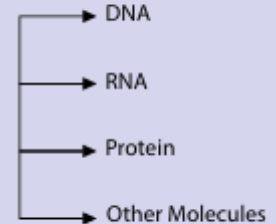


3 - **Centrifuge** around 1 min to pellet debris and beads



4 - **Transfer** cleared lysate by **pipeting** or further analysis

Purify



Precellys Evolution

- **Super Fast**
 - 4000 - 10 000rpm for very hard samples
- **Super Strong**
 - High quality manufacturing
- **Super Flexible**
 - Sizes of tubes from 0.2ml to 50ml
- **Super Efficient**
 - Powerful 3D motion
- **Super Easy**
 - Automatic tubes locking system



❄️ **Super protective:** patented cooling unit for sensitive samples



3D bead-beating movement giving the same efficiency to each tube

Precellys Evolution- Holder Pack



0.2mL (96WP) accessories
From 8 to 96 wells of 0.3mL
Prefilled 0.2mL (96WP) available



2mL accessories
Up to 24 tubes of 2mL (or 0.5mL)



7mL accessories
Up to 12 tubes of 7mL



15mL accessories
Up to 6 tubes of 15mL



50mL accessories
Up to 3 tubes of 50mL

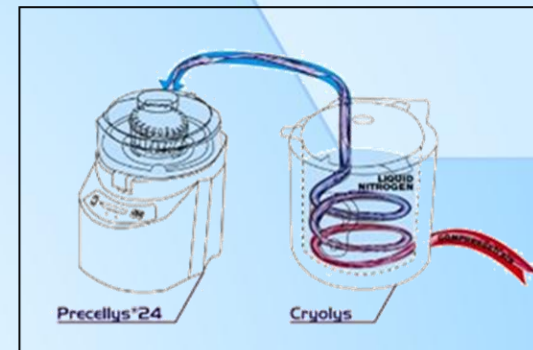


Metal tubes
Up to 6 tubes (6mL accessories)
Used for very hard samples



Cryolys cooling option for Evolution

- Patented technology:
 - Liquid nitrogen
 - Carbonic ice
- Cold compressed air sprayed inside the specific cover
- Samples cooled during grinding → keep optimal T°



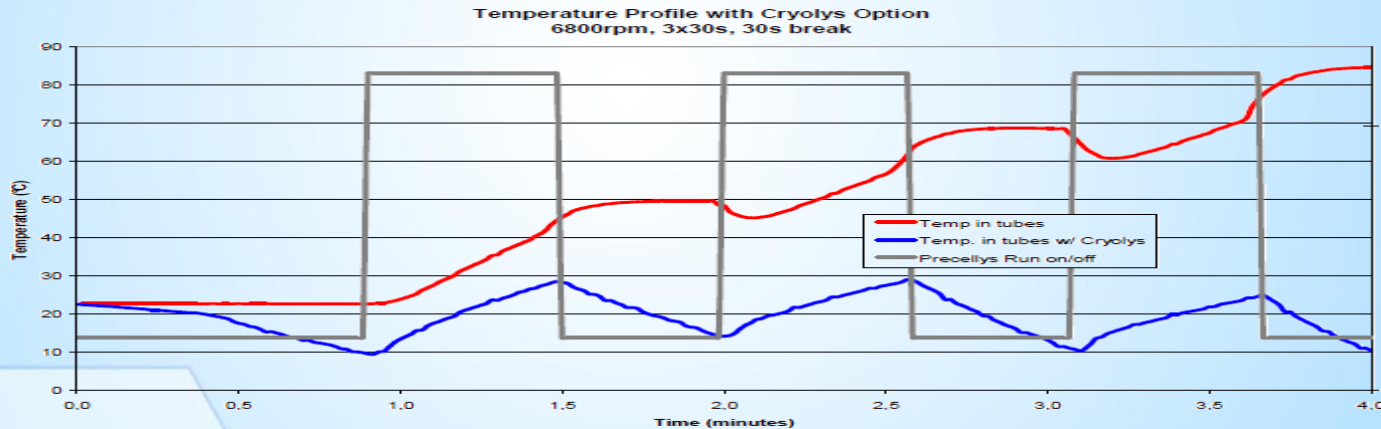
Air Flow from Cryolys to Precellys cover





Cryolys cooling option for Evolution

- Most of all Proteomic/RNA applications
- Cryolys is the only cooling option on the market for bead-beating
 - Competitors cool the sample only before the bead-beating process (red curve)
 - We are the only one to allow a cooling action during the process (blue curve)



Precellys Lysing kits



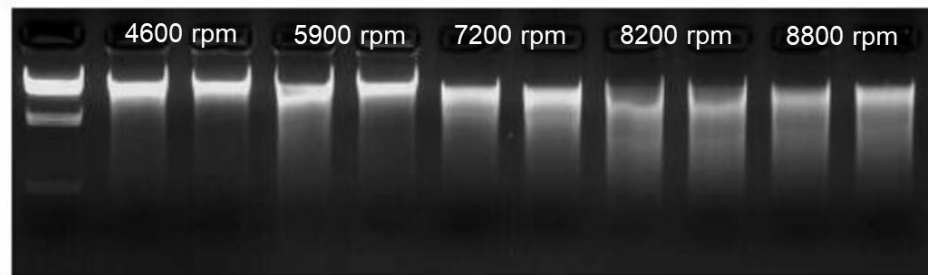
- **4 different types of beads**
 - Metal, Ceramic, Glass, Garnet flakes
- **6 different volumes**
 - 0.2mL (96WP), 0.5mL, 2mL,
 - 7mL, 15mL, 50mL
- **Quality: bead-beating proof**
 - Temperature range of use:
 - -80°C to 100°C (storage)
 - Autoclavable
 - Chemical compatibility:
 - Most of extraction buffer

NAME	APPLICATION	BEAD TYPE	AVAILABLE TUBE VOLUME						
			0.2mL (96WP)	0.5mL	2mL	2mL R*	7mL	15mL	50mL
VK01	Micro-organism lysing	0.1mm glass beads			✗				✗
VK05	Tough micro-organism lysing	0.5mm glass beads	✗	✗	✗			✗	
VKMix	Micro-organism lysing	0.1mm & 0.5mm glass beads						✗	
SK38	Micro-organism lysing within tissue	0.1mm glass beads 1.4mm ceramic beads 1 glass bead of 4.0mm			✗			✗	
CK01	Bacteria lysing	0.1mm ceramic beads			✗		✗	✗	
CKMix	Tissue homogenizing	1.4mm & 2.8mm ceramic beads			✗				
CK14	Soft tissue homogenizing	1.4mm ceramic beads	✗	✗	✗	✓		✗	
CK28	Hard tissue homogenizing	2.8 ceramic beads			✗		✗	✗	✗
CKMix50	Tissue grinding	2.8mm & 5.0mm ceramic beads					✗	✗	✗
CK68	Dry hard tissue grinding	6.8mm ceramic beads					✗		✗
MK28	Hard tissue grinding	2.8mm stainless steel beads			✗		✗		
Metal tubes	Bones & teeth grinding	empty tubes to fill with 6.8mm ceramic beads			✗			✗	

✓ Protein safe tubes available *Reinforced tubes

Nucleic Acid Extraction From Animal

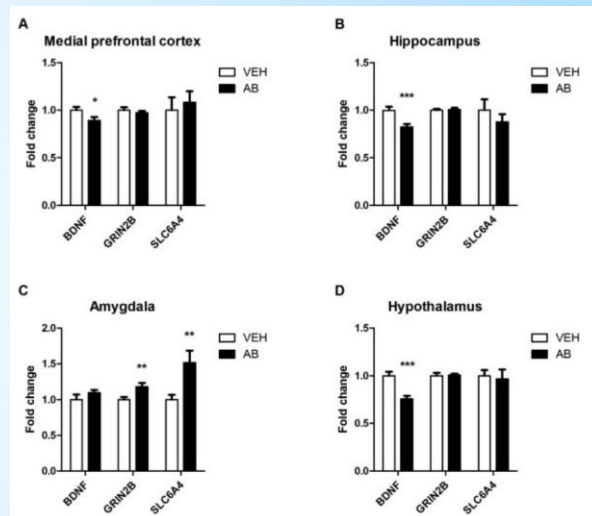
- Precellys lysing kit: CKMix_2mL
1.4 mm ceramic beads/ 2.8 mm ceramic beads
- Sample: 25 mg of **Bovine Liver** per prep.



Agarose gel (1.5%, 1xTAE) electrophoresis of DNA isolated from bovine liver homogenized with Precellys® Evolution at given rpm. M = DNA sizer II

- Precellys lysing kit: Soft tissue homogenizing kit CK14 2mL
- Sample :**Mice Brain Tissues**

Medial prefrontal cortex, Hypothalamus, Amygdala, Hippocampus

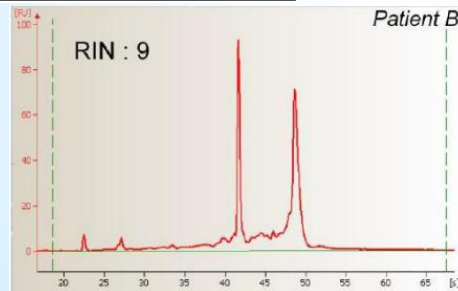
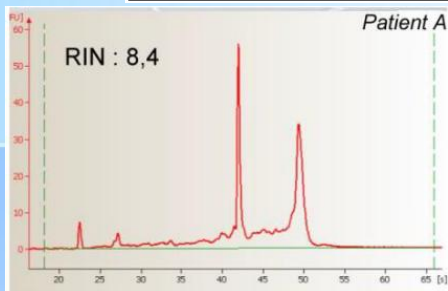


Antibiotic treatment alters the expression of neural signaling related molecules in a brain region specific manner.

Nucleic Acid Extraction From Human

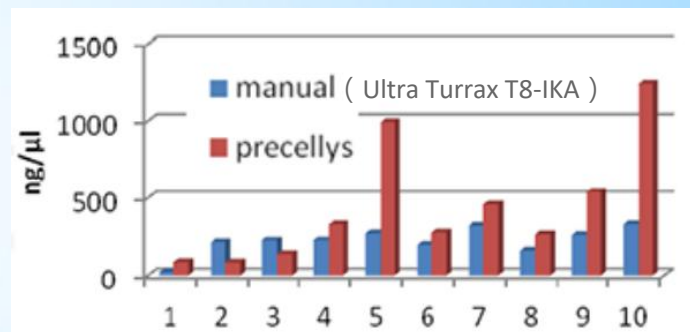
- Precellys® kit CK14 (small ceramic beads).
- Sample : **Human Skin Biopsies** (40-70mg).

	Classical Lysis	Precellys Lysis
Sample 1	124,6 ng/μl	454,0 ng/μl
Sample 2	160,0 ng/μl	638,0 ng/μl
Sample 3	198,7 ng/μl	801,1ng/μl



RNA yield increased from 2 to 4 fold (Nanodrop quantification). RNA quality was assessed using a 2100 Bioanalyser. RNA Integrity Number (RIN) is over 8, meaning good quality.

- Precellys kit: CKMix
1.4 mm ceramic beads/ 2.8 mm ceramic beads.
- Sample: 10 **Human Subcutaneous Adipose tissue (scAT)** samples (about 100 to 400 mg/sample) obtained by needle aspiration



extracted RNA yield obtained with Ultraturax and Precellys methods.

Nucleic Acid Extraction From Plant

- Precellys lysing kit: CKMix_2mL
1.4 mm ceramic beads/ 2.8 mm ceramic beads
- Sample: 100 mg of **Arabidopsis leaves** per prep.



Precellys® kit : SK38 (Mixed beads)

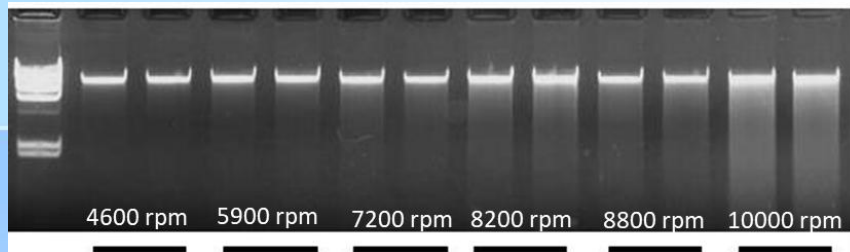
0.1 mm glass beads/ 1.4 mm ceramic beads/ 1 glass bead of 4.0 mm

Sample : 0.08g of **Rice Leaf** cut into pieces

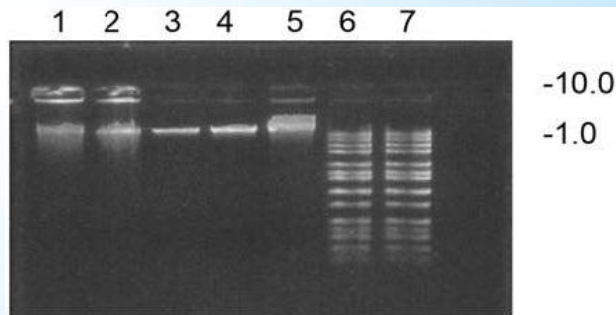


Left: Fresh leaves

Right: Homogenized leaves



Agarose gel (1.5%, 1xTAE) electrophoresis of DNA isolated from Arabidopsis leaves homogenized with Precellys® Evolution at given rpm.
M = DNA sizer II



Lanes 1 & 2: Rice leaf DNA.

Lanes 3-5: λ DNA standards

Lanes 6 & 7: Marker.

Protein Fractionation from Normal and Cystic kidneys with Precellys

•Precellys Lysing Kit: CK28-R 2mL

* Protein Safe Hard tissue homogenizing CK28-R 2mL

•Sample :**Mice Kidney tissues**

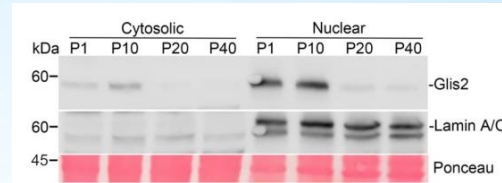
Adult wild type and Cystic C57BL/6J mice

Protocol:

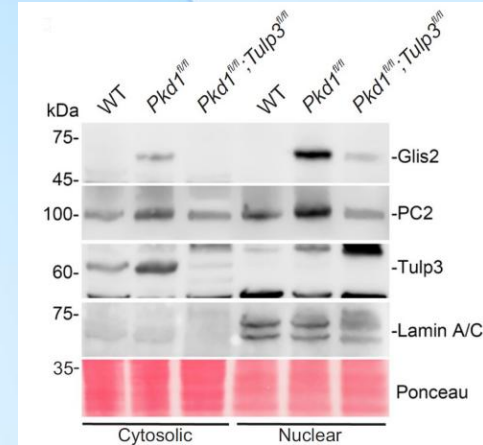
1. Use kidneys stored at -80°C , with approximately 1/4 used for protein preparation.
2. Cut tissues and transfer to CK-28-R tubes, adding lysis buffer.
3. Homogenize using Precellys Evolution at 6800rpm for 30s, with a 1-minute ice bath between runs.
4. Centrifuge and collect the supernatant (cytosolic fraction).
5. Resuspend the pellet in 1X Red Loading buffer and sonicate.

Conclusion:

1. Protein fractionation from wild-type, cystic, and rescue mouse kidneys analyzed Glis2 distribution with Lamin A/C as a nuclear marker.
2. This technology is vital for ADPKD research, supporting protein dynamics and therapeutic development.
3. The Precellys Evolution homogenizer efficiently produces high-quality protein fractions for reliable localization and expression comparisons.



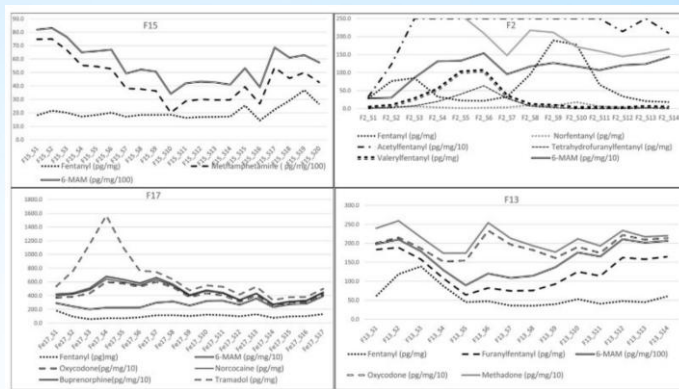
Immunoblot analysis shows Glis2 expression in cytosolic and nuclear fractions from wild-type (WT) mouse kidneys at different postnatal stages.



Immunoblot of kidney lysates from wild-type (WT), cystic (Pkd1^{fl/fl}), and disease rescue (Pkd1^{fl/fl}; Tulp3^{fl/fl}) mice.

Hair Synthetic Opioids Analysis and Fentanyl Analogue User History Evaluation

- **Sample:** **Hair sample** from US polydrug users cut into 1cm segments
- **Lysing kit:** MK28-R_2mL
- 2.8 mm stainless beads



Segmental hair analysis allows us to know the consumption history of several synthetic opioids from 4 US polydrug users who do fentanyl. The sample S1 is the nearest portion of the scalp are represented by sample "S1."

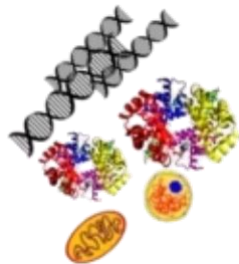
Protocol:

1. Hair samples from polydrug users were decontaminated with dichloromethane, methanol, and water for 2 minutes.
2. Samples were cut into 1 cm pieces for segmental analysis; "S1" represents the most recent hair pieces.
3. Each sample was homogenized using Precellys 24* (3 cycles of 60 seconds at 6500 rpm).
4. After centrifugation, solid-phase extraction was performed.
5. Separation was done using an Acquity UPLC BEH phenyl column and Xevo TQS.

Conclusion:

This **UHPLC-MS/MS** method enabled the first quantification of synthetic opioids, including vareryl fentanyl and tetrahydrofurfurylfentanyl from hair samples. It aids in analyzing polydrug histories of fentanyl users, helping labs identify synthetic opioids in specific groups.

Homogenization



- **Free molecules**
(proteins, hormones, small molecules etc. ..)
- **Nucleic acids**
(DNA/RNA)



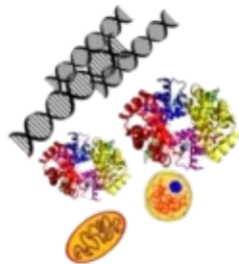
Application

Western blot
Mass spectrometry
ELISA

UPLC-MS/MS
GC-MS

PCR / qPCR
CRISPR/Cas9
WGS
RNA-Seq
Microarray

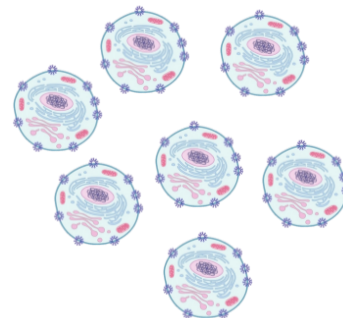
Homogenization



- **Free molecules**
(proteins, hormones, small molecules etc. ..)
- **Nucleic acids**
(DNA/RNA)



Dissociation



- **Living Single Cell**

How To Get SINGLE LIVING CELLS From A Fresh Tissue

- Tissue dissociation is a process by which a biological tissue is broken down into its individual living cells.
- This technique is essential for various applications in cell biology and medicine, particularly for **cell culture, gene expression analysis, and molecular biology studies**.

Enzymatic

- ✓ Easy to use
- ✓ No instrument needed
- ✓ High viability rate
- ✗ Manual method (reproducibility)
- ✗ Effective on soft tissues
- ✗ Low performances on hard tissues

Combination of Enzymatic & Mechanical

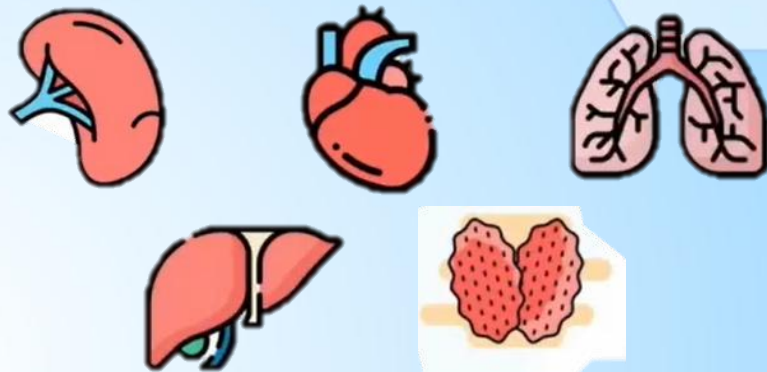
- ✓ Fast method
- ✓ High cell viability rate
- ✓ Effective on a wide variety of cells

Mechanical

- ✓ Fast method
- ✓ No need of reagent
- ✓ Effective on hard tissues
- ✗ Low viability rate (damage)
- ✗ Heterogenicity (size and type of cells)
- ✗ Low performances on soft tissues

PRECELLYS MULTI-TISSUE DISSOCIATION KIT

- Combination of **Enzymatic and Mechanical Dissociation**
- Patented Bead-Shearing Technology
- Starting from **FRESH TISSUE**(100-200mg) to get single living cells
- Validated on Liver (mouse) / Spleen (mouse) / Lung (human, mouse) / Heart (mouse) / Thymus (mouse)
- **80% Cell Viability Rate**



WORKFLOW OF PRECELLYS MULTI-TISSUE DISSOCIATION KIT



Add the enzymes mix and the sample in the dissociation tube



Place the tube in the Precellys - 4500 rpm x 3 seconds



Incubate at 37°C for 30 mins



300 g for 10 minutes centrifugation + resuspension



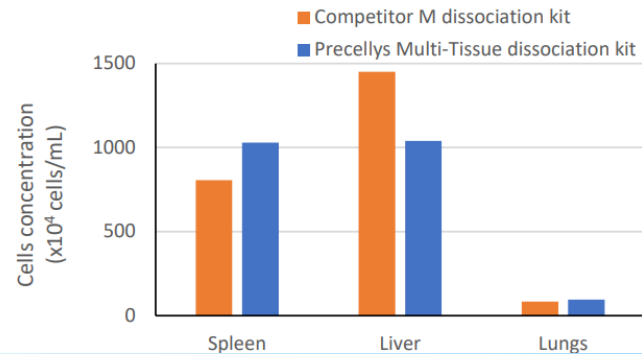
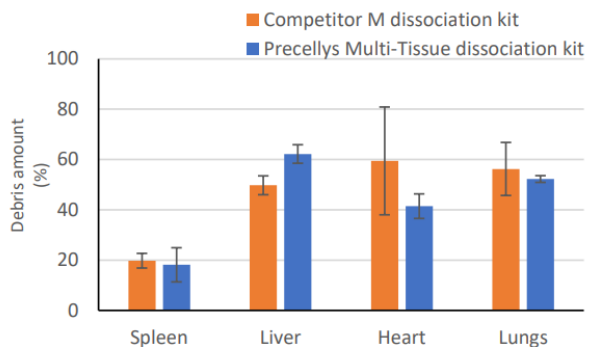
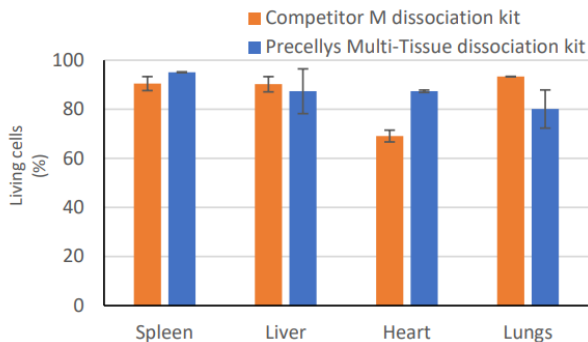
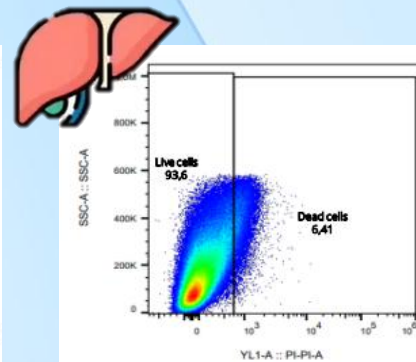
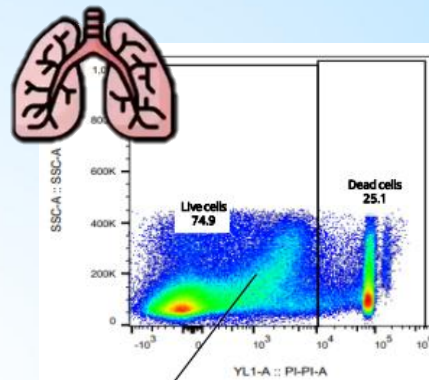
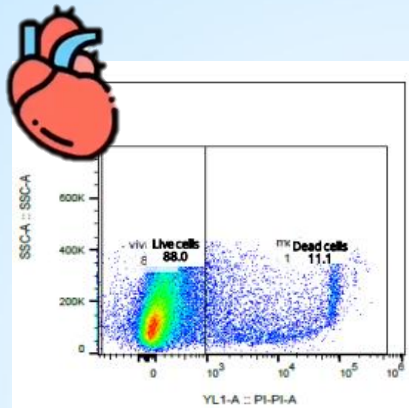
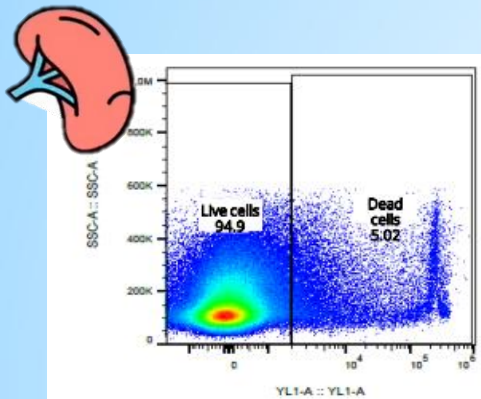
Resuspend sample and filter through a 100 µm cell strainer



Place back the tube in the Precellys - 4500 rpm x 3 seconds



COMPARATIVE TISSUE DISSOCIATION PERFORMANCE: PRECELLYS MULTI-TISSUE DISSOCIATION KIT VS. COMPETITOR KIT



Application

Single Cell Analysis

Nucleic Acids

Lipidomic

Metabolomic

Sequencing

Cell Culture

New line

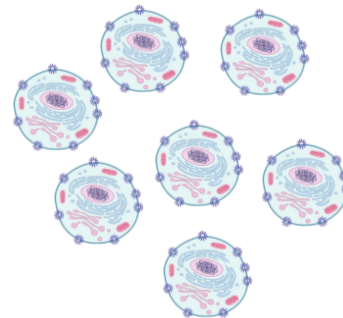
Differentiation

Cytotoxicity

Regenerative medicine

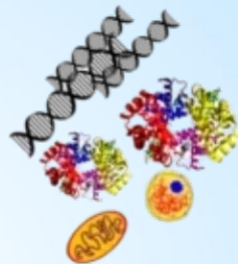
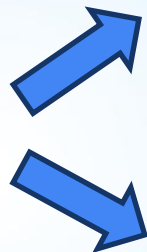


Dissociation



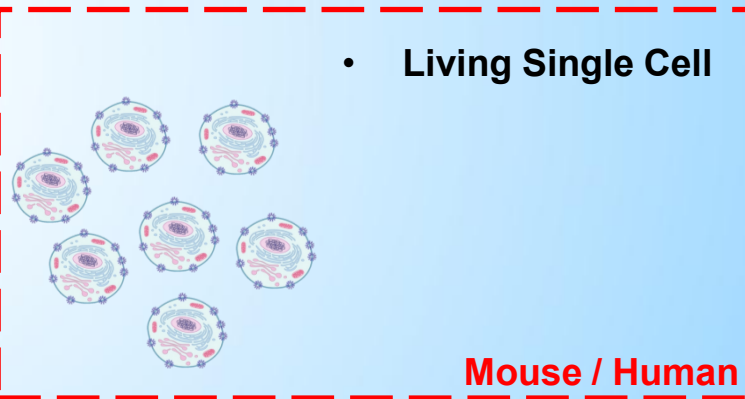
- **Living Single Cell**

Summary



- **Free molecules**
(proteins, hormones, small molecules etc. ...)
- **Nucleic acids**
(DNA/RNA)

- **Living Single Cell**



Mouse / Human

Lysing Kit Application Protocol Search

Careers



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Protein extraction comparison between precellys evolution touch and sonication

Assessment of the Coriolis Compact on Microbial Monitoring of Spacecraft Air

Heart dissociation in mice using Precellys Multi-tissue dissociation kit

Drug Screening in Hair at 8 Seconds per Sample Using the Precellys 24 Touch and Luxon-MS/MS





Thank You!



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