Single Cell Analysis and Imaging core facility (SCAI-Lab) at the Centre for Applied Biomedical Research (CRBA)
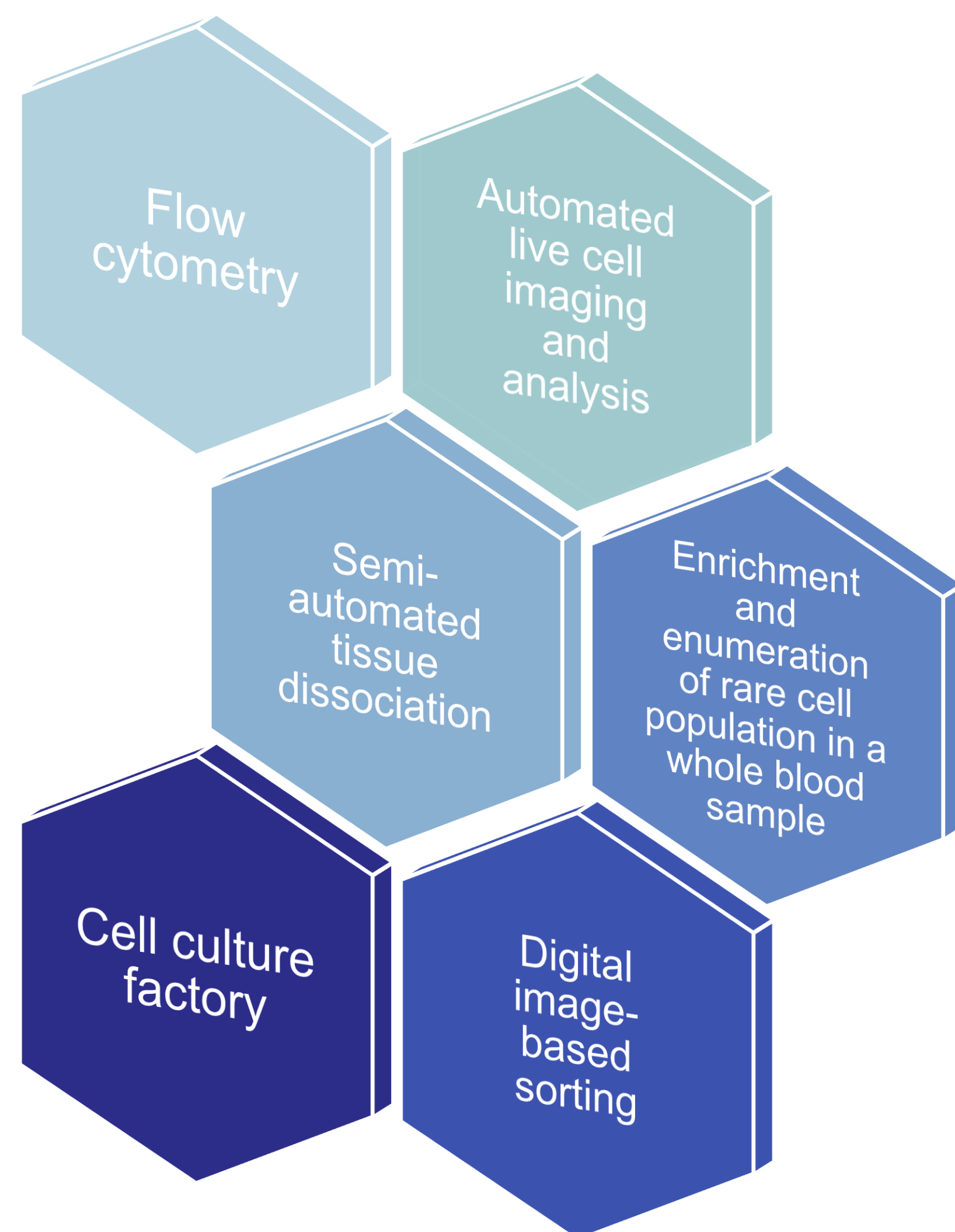
Petrovic B., Scalambra L.

University of Bologna, Department of Medical and Surgical Sciences (DIMEC), Bologna, Italy

Technologies and services at SCAI-Lab

The SCAI-Lab (Single Cell Analysis and Imaging) facility was founded in 2020 and houses a range of cutting-edge instrumentation for cell study and isolation.

- Flow cytometry
- Automated live cell imaging and analysis
- Semi-automated tissue dissociation
- Enrichment and enumeration of rare cell population in a whole blood sample
- Cell culture factory
- Digital image-based sorting

The **IncuCyte S3** system (Sartorius) allows to monitor and quantify the behavior of cells/spheroids/organoids directly in culture in real time.

The **CytoFLEX** Flow Cytometer (Beckman Coulter) guarantees high performances and provides superior sensitivity and resolution, that enable the detection of nanoparticles.
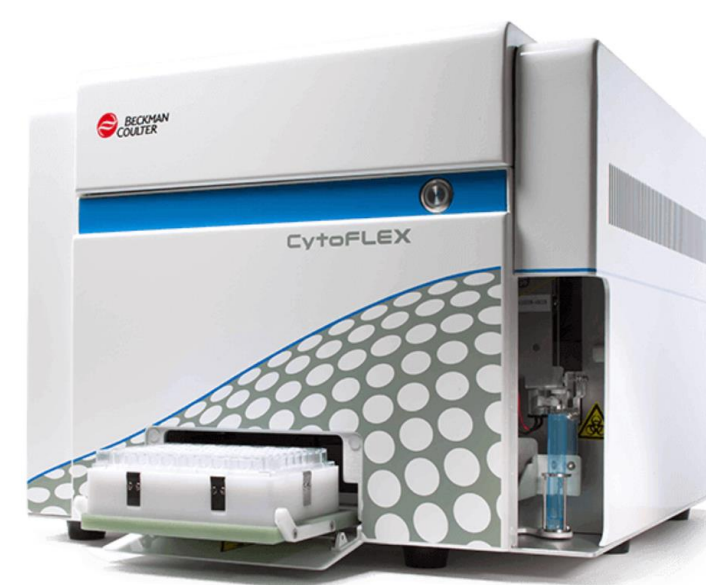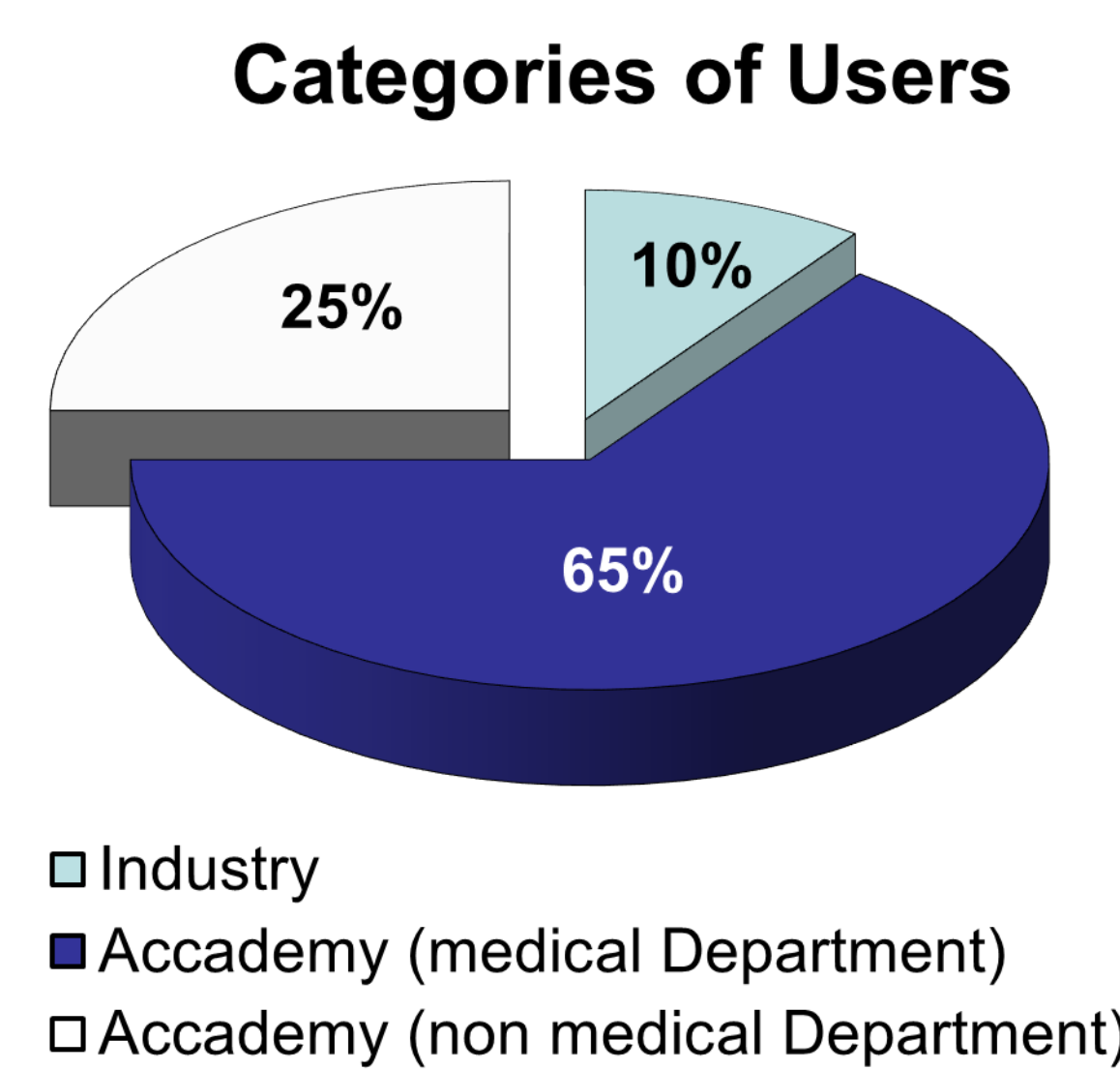
The **CellSearch** platform (Menarini Silicon Biosystems) allows the enrichment and enumeration of circulating tumor cells (CTCs) and circulating endothelial cells (CEC) from whole blood.

The **DEPArray NxT (**Menarini Silicon Biosystems) digital image-based sorter, guarantees, with a high degree of purity, the recovery of the single cell of interest.

The **gentleMACS Octo Dissociator** with Heaters (Miltenyi) offers a fully automated workflow for tissue dissociation.
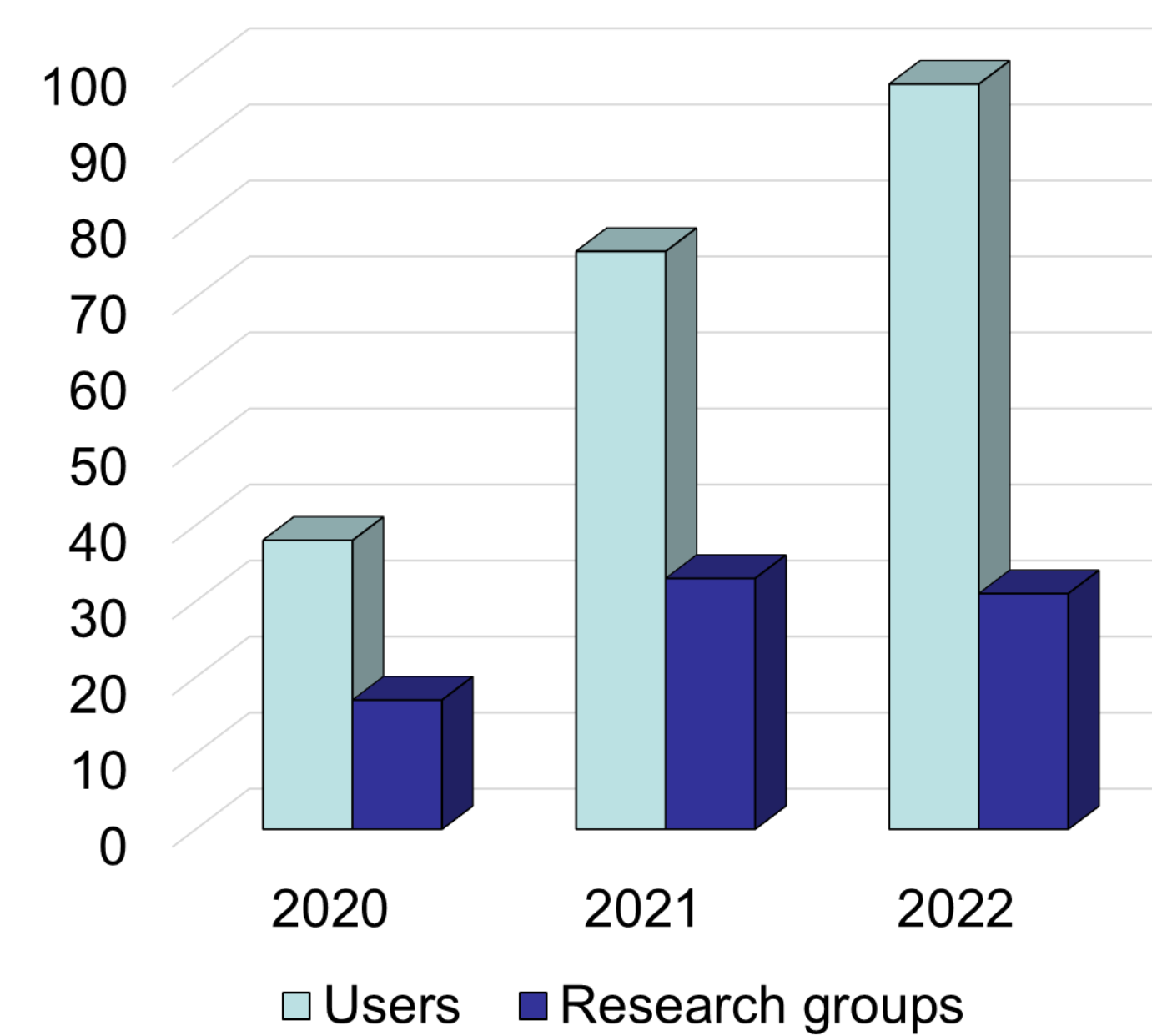
Performance analysis and assessment

Categories of Users

- Industry — 25%
- Accademy (medical Department) — 65%
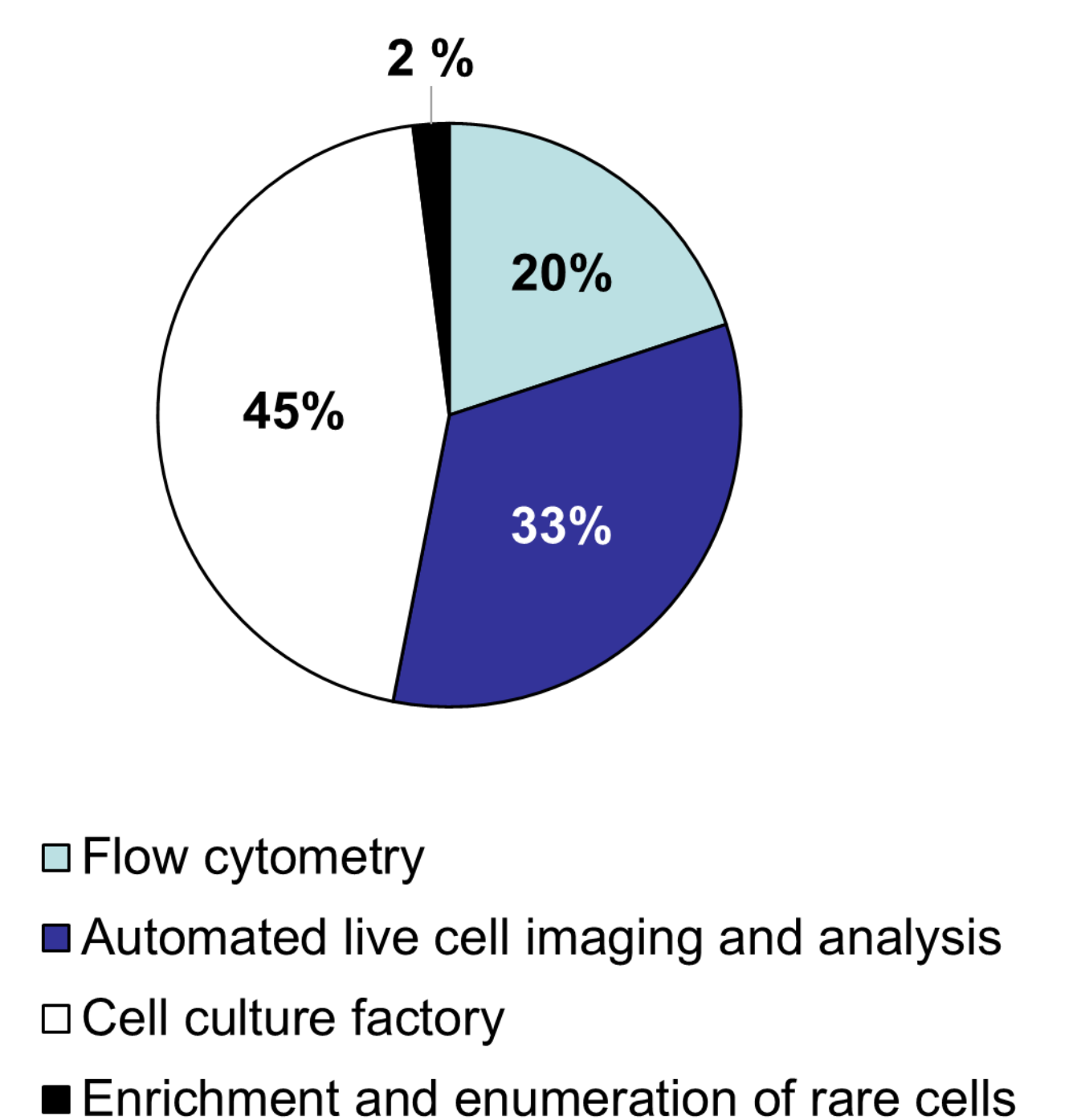- Accademy (non medical Department) — 10%

The SCAI-Lab three-year assessment shows the Medical Department as the predominant user affilation.
Among non-medical Departments, the facility welcomes a range of different disciplines.

The increasing trend shown by the number of users and research groups over time suggests an expansion of SCAI-Lab.
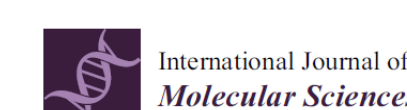
User trend with time

- Users
- Research groups

(2020, 2021, 2022)

User distribution among technologies

- 2%
- 20%
- 45%
- 33%

- Flow cytometry
- Automated live cell imaging and analysis
- Cell culture factory
- Enrichment and enumeration of rare cells

Key publications

International Journal of **Molecular Sciences** — MDPI

Article

Circulating Endothelial Cells: A New Possible Marker of Endothelial Damage in Kawasaki Disease, Multisystem Inflammatory Syndrome in Children and Acute SARS-CoV-2 Infection

Marianna Fabi [1], Biljana Petrovic [2,3], Laura Andreozzi [1,*], Elena Corinaldesi [4], Emanuele Filice [1], Carlotta Biagi [1], Alessia Rizzello [*], Bianca Elisa Mattesini [*], Simone Bugani [2,3] and Marcello Lanari [1]

Table 4. CEC values during acute and subacute stages, in the three groups of patients.

	KD (n = 9)	MIS-C (n = 20)	AC19 (n = 10)	P
Acute Phase				
CECs num/mL, median (IQR)	16.3 (13.6–48.8) *	3 (4–13.5) *	27.1 (9.3–101.7)	0.042
CECs > ov, n (%)	6/6 (100%) *	5/19 (26.3%) *‡	7/10 (70%) ‡	0.003
Syncytia, n (%)	3/6 (50%)	3/19 (15.8%)	3/10 (30%)	n.s.
Subacute phase				
CECs num/mL, median (IQR)	45.8 (18.5–131.0) *	3.6 (1.8–21.6) *	-	0.01
CECs > ov, n (%)	7/9 (77.8%) *	6/18 (30%) *	-	0.046
Syncytia, n (%)	4/9 (44.4%)	3/18 (16.7%)	-	n.s.

KD stands for Kawasaki Disease; MIS-C stands for Multisystem Inflammatory Syndrome in Children; AC19 stands for acute COVID-19; CECs stands for circulating endothelial cells. * stands for statistically significant difference between KD and MIS-C, ‡ stands for statistically significant difference between MIS-C and AC19; ov stands for normal values; n.s. stands for not significant.

iu bioengineering — MDPI

Article

Characterization of Perinatal Stem Cell Spheroids for the Development of Cell Therapy Strategy

Francesca Paris [1], Pasquale Marrazzo [1,*], Valeria Pizzuti [1], Cosetta Marchionni [1], Maura Rossi [2], Martina Michelotti [1], Biljana Petrovic [2,3], Elisabetta Ciani [4], Giuliana Simonazzi [2,5], Andrea Pession [6], Laura Bonsi [1] and Francesco Alviano [1]
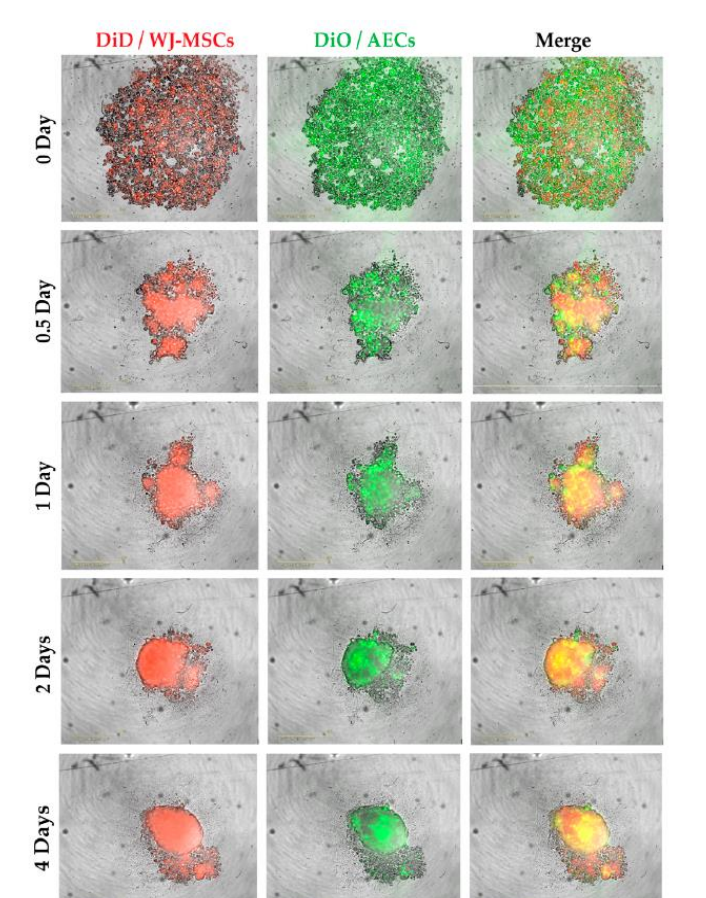
1. Circulating Endothelial Cells: A New Possible Marker of Endothelial Damage in Kawasaki Disease, Multisystem Inflammatory Syndrome in Children and Acute SARS-CoV-2 Infection. Fabi M, **Petrovic B**, Andreozzi L, Corinaldesi E, Filice E, Biagi C, Rizzello A, Mattesini BE, Bugani S, Lanari M. International Journal of Molecular Science, 2022 September.
2. Characterization of Perinatal Stem Cells Spheroids for the Development of Cell Therapy Strategy against Diabetes. Paris F, Marrazzo P, Pizzuti V, Marchionni C, Rossi M, Michelotti M, **Petrovic B**, Ciani E, Simonazzi G, Pession A, Bonsi L and Alviano F. Bioengineering, 2023, February.

For more information contact biljana.petrovic2@unibo.it
https://centri.unibo.it