MOSBRI
Molecular-Scale Biophysics Research Infrastructure

A new European Research Infrastructure in the field of molecular-scale biophysics

"Between atom and cell"

A dynamic interdisciplinary field

that aims to study biological macromolecules and assemblies

at an intermediate level

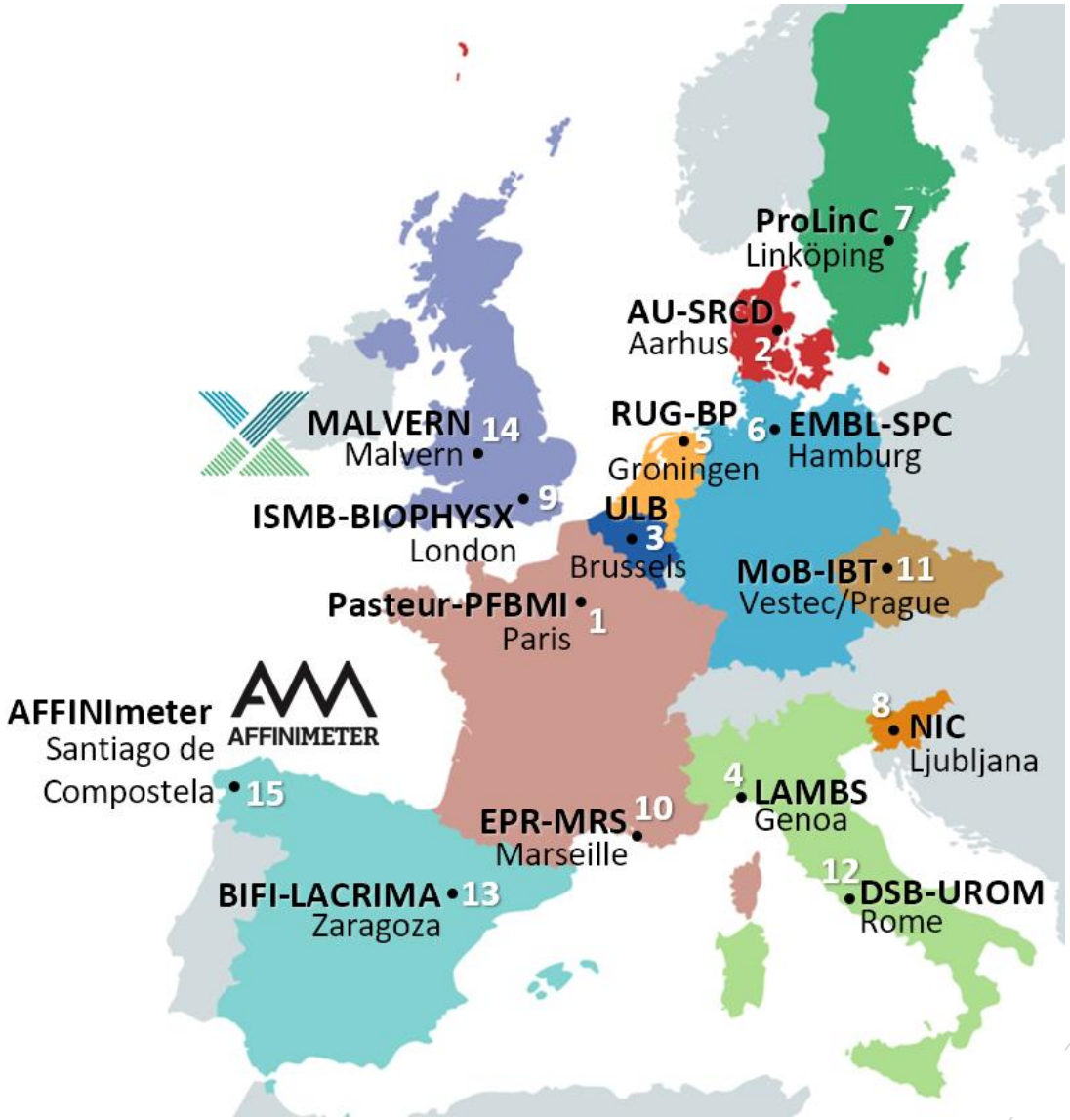
between atomic-resolution structural descriptions

and cellular-scale observations

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004806

Who is MOSBRI?

- 15 partners from 11 countries (13 academic, 2 industrial)
- Co-ordinated by Institut Pasteur (Paris, France)
- Started on the 1st of July 2021 (duration: 4 years)
- **More complete information about MOSBRI will be provided at the end of the course**



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www.mosbri.eu

MOSBRI Molecular-Scale Biophysics Research Infrastructure

MOSBRI courses and conferences

- **Training schools and courses: 14 courses will be organized until june 2025**

Full list : https://www.mosbri.eu/events/courses/

- *Circular Dichroism: best practice and data analysis (Århus, 3-5 November 2021)*
- *Quality control of purified proteins (Paris, 4-8 April 2022)*
- **Fluorescence Microscopy for amyloid fibril imaging** (Linköping, 23-25 May 2022)

Registrations open; Deadline April 19th

- Quality control for integral membrane proteins (Hamburg, 12-14 September 2022)

Registration opening in May

- **1st MOSBRI conference** (Institut Pasteur, Paris, France, 20-22 June 2022):

https://www.mosbri.eu/events/conferences/paris-2022/
Registrations open; Deadline May 20th

Next conferences in Zaragoza (june 2023) and Ljubljana (june 2024)

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Quality control of purified proteins
QC4Bio

This basic-level training course is aimed at biologists, immunologists, pharmacologists, biochemists, structural biologists, etc., who want to improve their skills in quality control of protein samples, and more specifically on the analysis and optimization of their samples for a variety of downstream applications.

The objective is to help warranting more productive, robust and reproducible research by applying quality control pipelines systematically to all purified protein samples.

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The issue of reproducibility

The analysis of different cores facilities in Europe

- A lot of time is spent on poor quality samples

- The best experiments in the world will turn garbage in expensive garbage

Our aim:

Improving the quality of the samples is essential to improve the quality, reproducibility, accuracy of the results we produce

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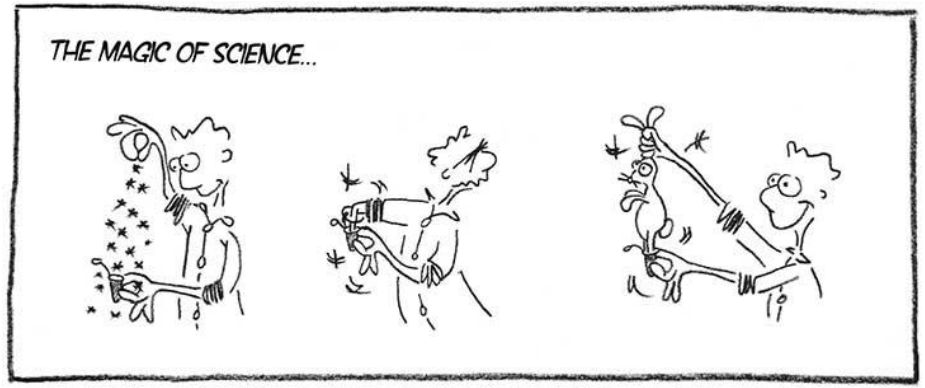
Researcher Opinion about QC



- **“I do not have time…”**
- **“My boss thinks it is a waste of time…”**
- **“It is the way we have prepared samples in the lab for the last ten years….”**
- **“But some experiments have worked with this sample…”**
- **“I do not know how to do it…”**
- **“I will do the experiment anyway it may work…”**
- **“Not me, I prepare the best sample…”**

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Differents approaches to solve the issue

Lebendiker *et al. BMC Research Notes* 2014, **7**:585
http://www.biomedcentral.com/1756-0500/7/585

BMC Research Notes

CORRESPONDENCE Open Access

The Trip Adviser guide to the protein science world: a proposal to improve the awareness concerning the quality of recombinant proteins

Mario Lebendiker[†], Tsafi Danieli[†] and Ario de Marco[*]

Raynal *et al. Microbial Cell Factories* (2014) 13:180
DOI 10.1186/s12934-014-0180-6

MICROBIAL CELL FACTORIES

REVIEW Open Access

Quality assessment and optimization of purified protein samples: why and how?

Bertrand Raynal[1,2*], Pascal Lenormand[1,2], Bruno Baron[1,2], Sylviane Hoos[1,2] and Patrick England[1,2*]

Protein production and purification

Structural Genomics Consortium[1–3], Architecture et Fonction des Macromolécules Biologiques[4], Berkeley Structural Genomics Center[5], China Structural Genomics Consortium[6,7], Integrated Center for Structure and Function Innovation[8], Israel Structural Proteomics Center[9], Joint Center for Structural Genomics[10,11], Midwest Center for Structural Genomics[12], New York Structural GenomiX Research Center for Structural Genomics[13–17], Northeast Structural Genomics Consortium[18,19], Oxford Protein Production Facility[20], Protein Sample Production Facility, Max Delbrück Center for Molecular Medicine[21], RIKEN Structural Genomics/ Proteomics Initiative[22] & SPINE2-Complexes[23,25]

Quality Assessment of Recombinant Proteins Produced in Plants

Giuliana Medrano, Maureen C. Dolan, Jose Condori, David N. Radin, and Carole L. Cramer

Argelia Lorence (ed.), *Recombinant Gene Expression: Reviews and Protocols, Third Edition*,
Methods in Molecular Biology, vol. 824, DOI 10.1007/978-1-61779-433-9_29, © Springer Science+Business Media, LLC 2012

Commentary Open Access

Minimal information: an urgent need to assess the functional reliability of recombinant proteins used in biological experiments

Ario de Marco

Address: COGENTECH, via Adamello 16, 20139, Milano, Italy
Email: Ario de Marco - ario.demarco@ifom-ieo-campus.it

Published: 23 July 2008
Microbial Cell Factories 2008, **7**:20 doi:10.1186/1475-2859-7-20

Received: 24 June 2008
Accepted: 23 July 2008

Protein Sample Characterization

Tina Daviter and Rémi Fronzes

Mark A. Williams and Tina Daviter (eds.), *Protein-Ligand Interactions: Methods and Applications*, Methods in Molecular Biology,
vol. 1008, DOI 10.1007/978-1-62703-398-5_2, © Springer Science+Business Media New York 2013

Standards in Genomic Sciences (2011) 5:195-197 DOI:10.4056/sigs.1834511

Recombinant protein quality evaluation: proposal for a minimal information standard

Ashley M. Buckle[1,15], Mark A. Bate[1], Steve Androulakis[2], Mario Cinquanta[3], Jerome Basquin[4], Fabien Bonneau[4], Deb K. Chatterjee[5], Davide Cittaro[3], Susanne Gräslund[6], Alicja Gruszka[7], Rebecca Page[8], Sabine Suppmann[9], Jun X. Wheeler[10], Deborah Agostini[3], Mike Taussig[11], Chris F. Taylor[12], Stephen P. Bottomley[1], Antonio Villaverde[13], Ario de Marco[14,*]

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QC Worflow in Institut Pasteur

- Prior QC

- Concentration measurement
- UV Spectrum

- Initial sample assessment

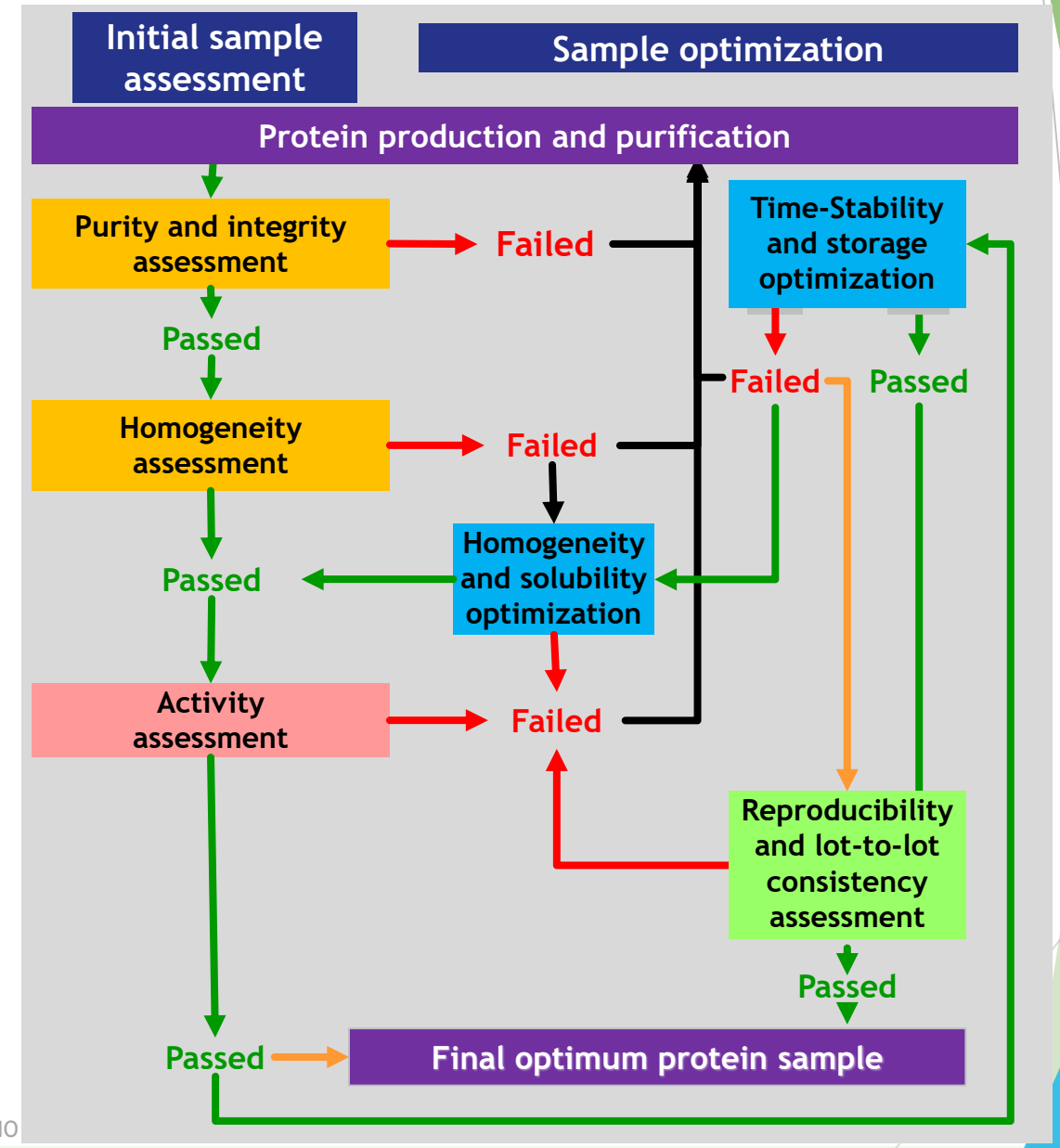
- Integrity
- Purity
- Homogeneity

- Activity assessment

- Sample optimization

- Homogeneity
- Solubility
- Time stability
- Storage

- Reproducibility



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nature COMMUNICATIONS

COMMENT

https://doi.org/10.1038/s41467-021-23167-z OPEN

Quality control of protein reagents for the improvement of research data reproducibility

Ario de Marco[1], Nick Berrow[2], Mario Lebendiker[3], Maria Garcia-Alai[4], Stefan H. Knauer[5], Blanca Lopez-Mendez[6], André Matagne[7], Annabel Parret[4], Kim Remans[8], Stephan Uebel[9] & Bertrand Raynal[10]✉

European Biophysics Journal (2021) 50:453–460
https://doi.org/10.1007/s00249-021-01528-2

BIOPHYSICS LETTER

Quality control of purified proteins to improve data quality and reproducibility: results from a large-scale survey

Nick Berrow[1] · Ario de Marco[2] · Mario Lebendiker[3] · Maria Garcia-Alai[4] · Stefan H. Knauer[5] · Blanca Lopez-Mendez[6] · André Matagne[7] · Annabel Parret[11] · Kim Remans[8] · Stephan Uebel[9] · Bertrand Raynal[10]

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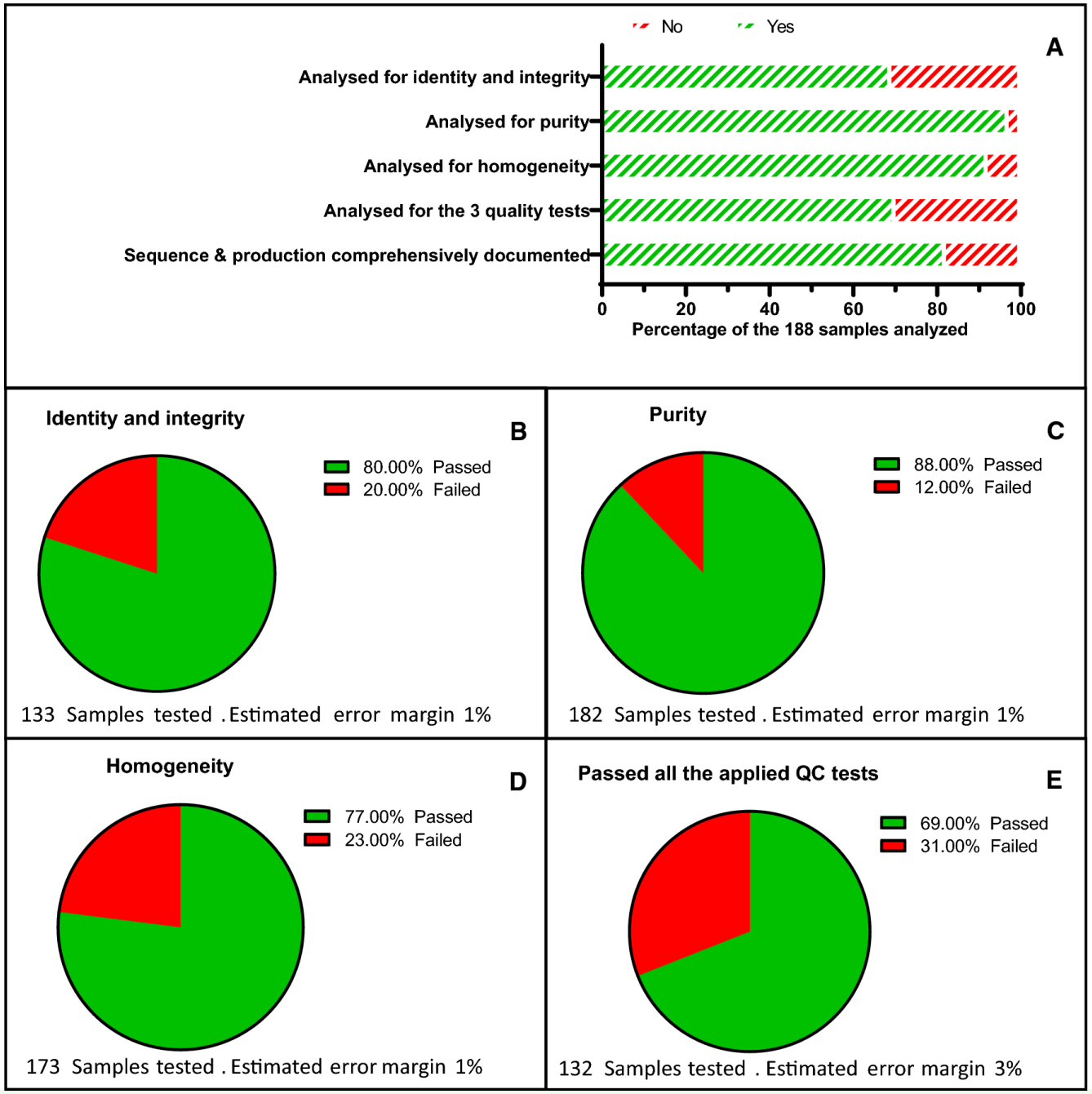

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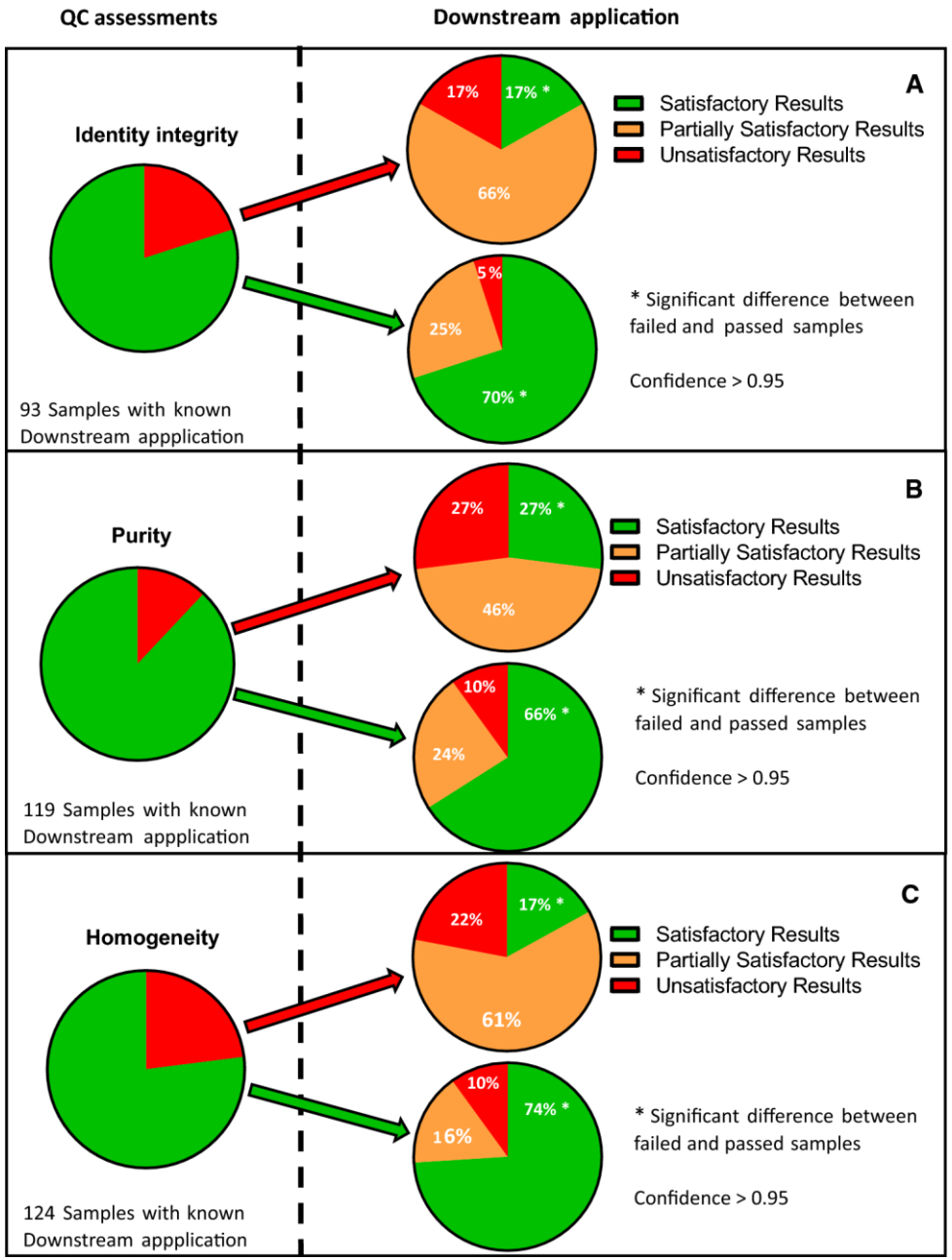

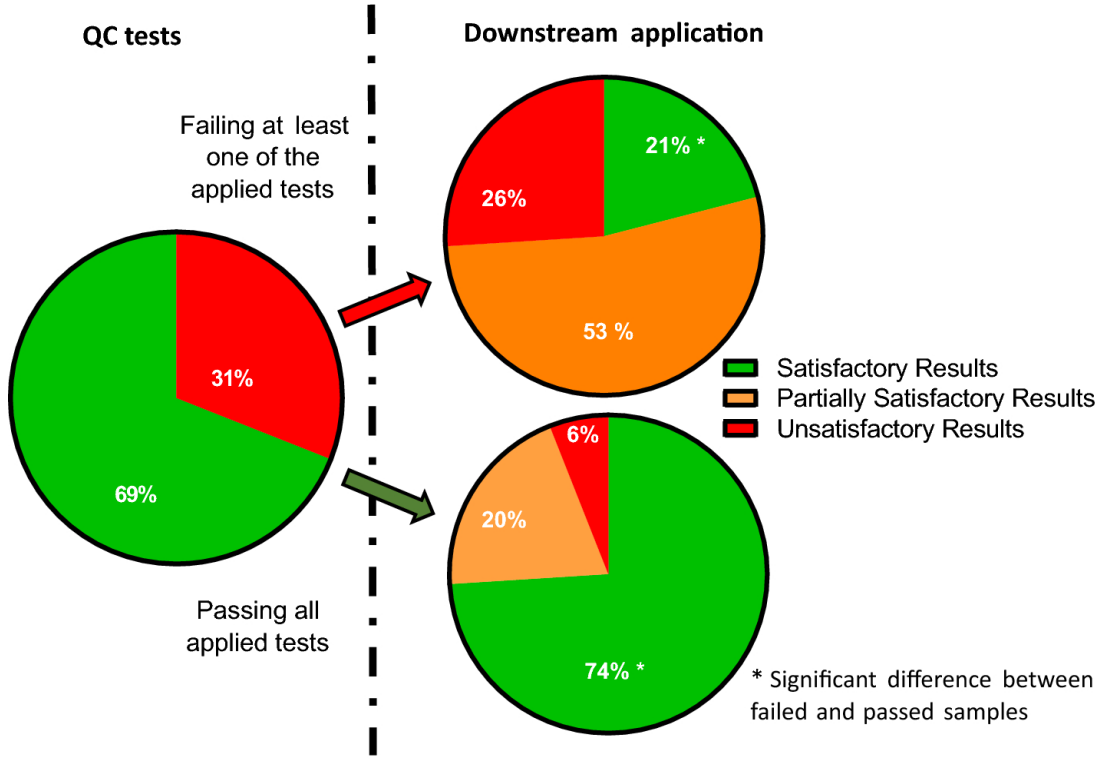

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Plan for this week

Topic of the day	Monday	Tuesday						Wednesday						Thursday				Friday	Topic of the day
	Purification Basic quality control of protein samples	Basic quality control of protein samples						Basic quality control of protein samples and optimization						Optimization				Conclusion	
9H00	Registration Coffee	Tutorial on production group 1 Metch 3ieme	Tutorial on production group 2 Metch 3ieme	Group 3 UV DLS	Group 4 SEC SLS	Group 5 CD	Group 6 MALDI	Group 1 MALDI	Group 2 CD	Tutorial on purification group 3 Metch 3ieme	Tutorial on purification group 4 Metch 3ieme	Group 5 SEC SLS	Group 6 UV DLS	Free time	Group 4 DLS	Group 5 DSF	Tutorial Bufferscreen design group 6 Metch 4ieme	Dry Pratical Summary of all the measurements performed	9H00
															Group 4 DSF	Tutorial Bufferscreen design group 5 Metch 4ieme	Group 6 DLS		
10H00	Course Introduction																		10H00
10H20	Protein Production (Cédric Montigny)	Coffee Break						Coffee Break										Coffee Break	10H20
10H40		Group 1 CD	Group 2 MALDI	Tutorial on production group 3 Metch 3ieme	Tutorial on production group 4 Metch 3ieme	Group 5 UV DLS	Group 6 SEC SLS	Group 1 SEC SLS	Group 2 UV DLS	Group 3 MALDI	Group 4 CD	Tutorial on purification group 5 Metch 3ieme	Tutorial on purification group 6 Metch 3ieme	Coffee Break				Dry Pratical Summary of all the measurements performed	10H40
														Visit of the Xtalography Core facility	Tutorial Bufferscreen design group 6 Metch 4ieme	Group 5 DLS	Group 6 DSF		
12H00		Lunch						Lunch										Course evaluation	12H00
														Lunch				Lunch	
13H00	Lunch																	MOSBRI an infrastructure to support your research (Patrick England)	13H00
13H20		Mass Spectroscopy (Mariette Matando)						DSF Thermofluor Native nanoDSF (Maria Garcia)											13H20
13H40														Crystalography (Serena Sirigu)					13H40
14H00	Affinity Chromatography Ion exchange Chromatography (JP Boursier)	SEC-SLS (Stefan Cairns)						Electron Microscopy (Adeline Mallay)											14H00
														Quality control for research project (Paloma Fernandez)					
15H20	Size exclusion chromatography (JP Boursier)	Group 1 UV DLS	Group 2 SEC SLS	Group 3 CD	Group 4 MALDI	Tutorial on production group 5 Metch 3ieme	Tutorial on production group 6 Metch 3ieme	Group 1 DLS	Group 2 DSF	Tutorial Bufferscreen design group 3 Metch 3ieme	Visit of the Xtalography Core facility								15H20
15H40														Coffee Break					15H40
16H00	Coffee Break																		16H00
16H20	UV Spectroscopy and cirular dichroism (Sebastien Brulé)							Coffee Break						Visit of the production unit					16H20
16H40		Coffee Break						Group 1 DSF	Tutorial Bufferscreen design group 2 Metch 3ieme	Group 3 DLS	Free time								16H40
17H20	Dynamic light scaterring (Bertrand Raynal)	Tutorial on purification group 1 Metch 3ieme	Tutorial on purification group 2 Metch 3ieme	Group 3 SEC SLS	Group 4 UV DLS	Group 5 MALDI	Group 6 CD	Tutorial Bufferscreen design group 1 Metch 3ieme	Group 2 DLS	Group 3 DSF									17H20
18H	Welcome Drink																		18H
19H																			19H
20H														Workshop dinner					20H

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