

The background of the slide is a grayscale electron micrograph showing a dense field of extracellular vesicles. These vesicles appear as numerous small, dark, circular or oval structures of varying sizes, some with distinct membranes and internal structures, scattered across a lighter gray background.

EV-TRACK

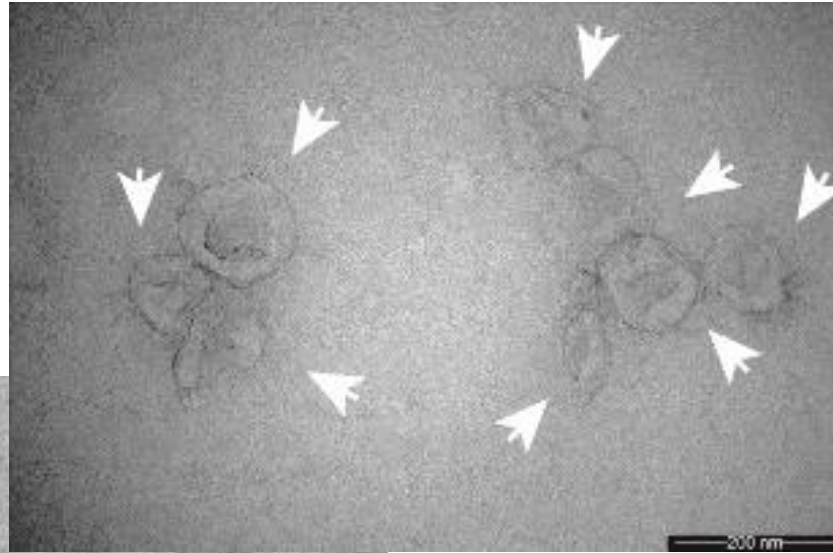
**An online toolset for transparent reporting and centralizing
knowledge of extracellular vesicles**

An Hendrix

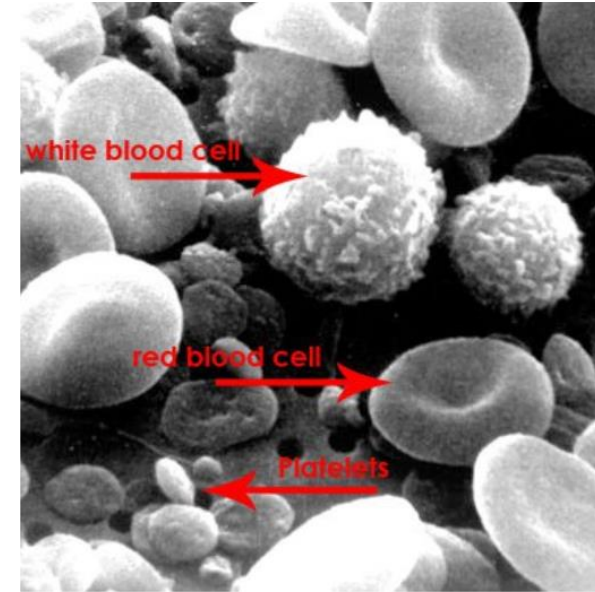
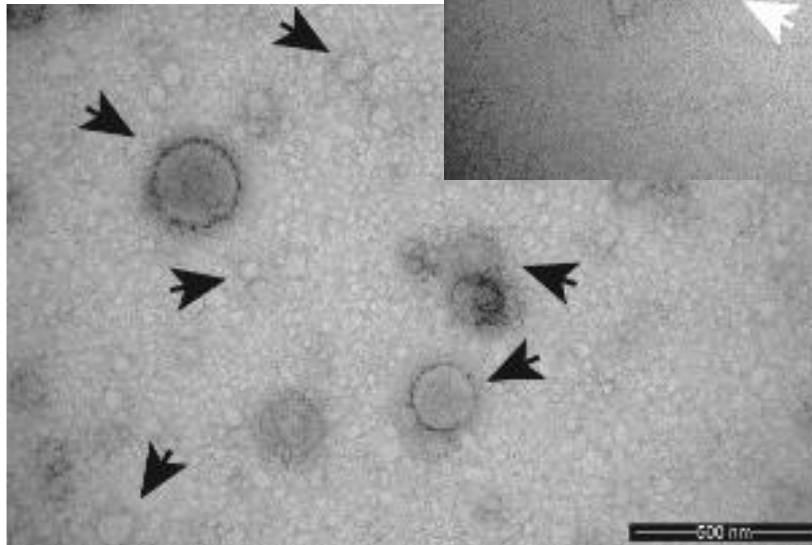
Laboratory of Experimental Cancer Research
Cancer Research Institute Ghent
Ghent University
Belgium

The complexity of biofluids (liquid biopsies)

extracellular vesicles

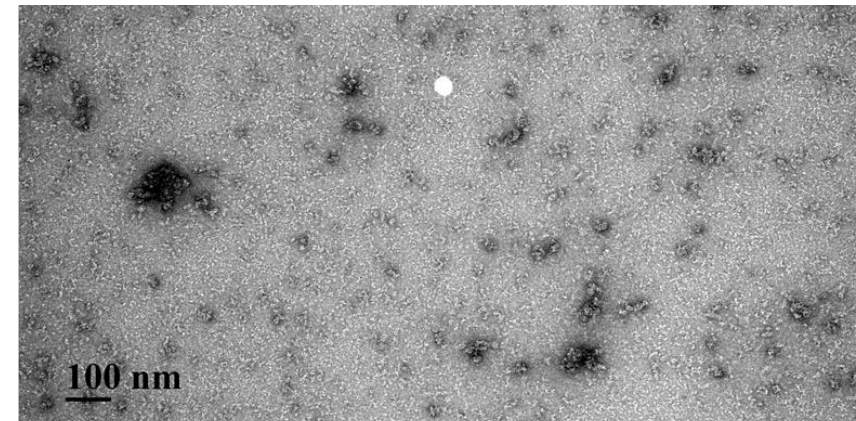


lipoproteins

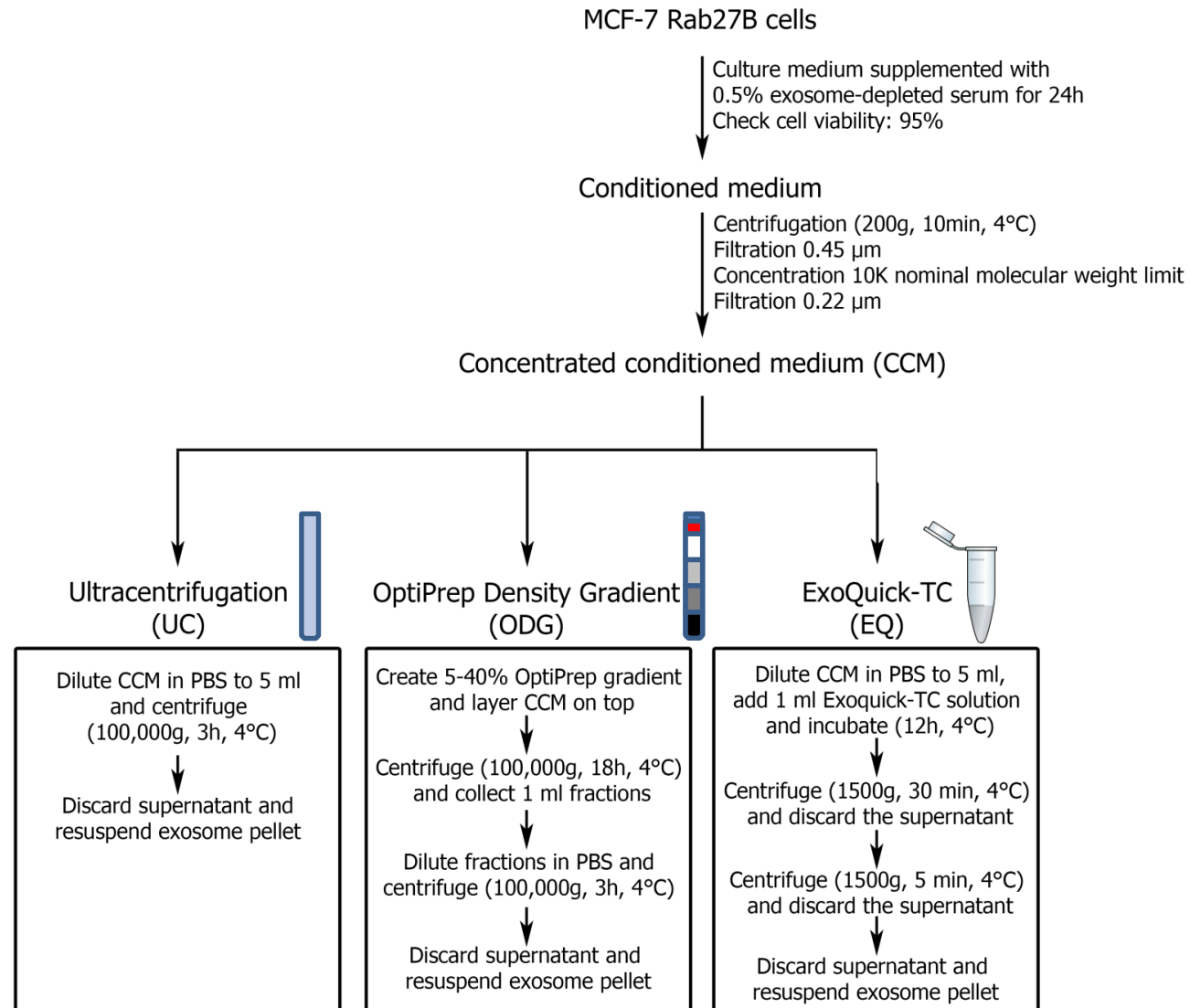


abundant proteins and aggregates

albumin, globulin, fibrinogen, Tamm Horsfall protein ...



Do different EV isolation methods impact downstream RNA analysis?

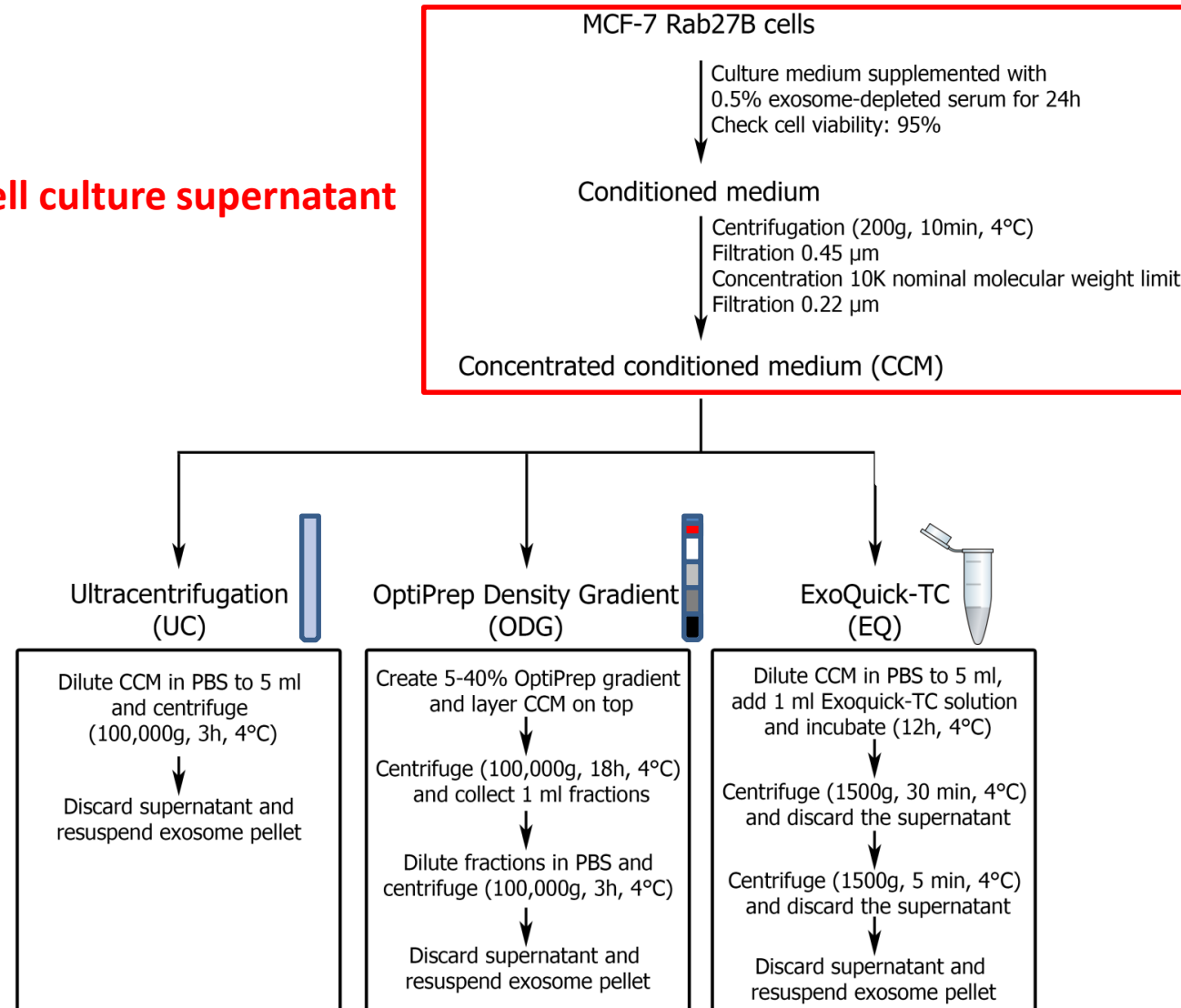


Van Deun et al., Journal of Extracellular Vesicles, 2014

Hendrix et al., JNCI, 2010

Do different EV isolation methods impact downstream RNA analysis?

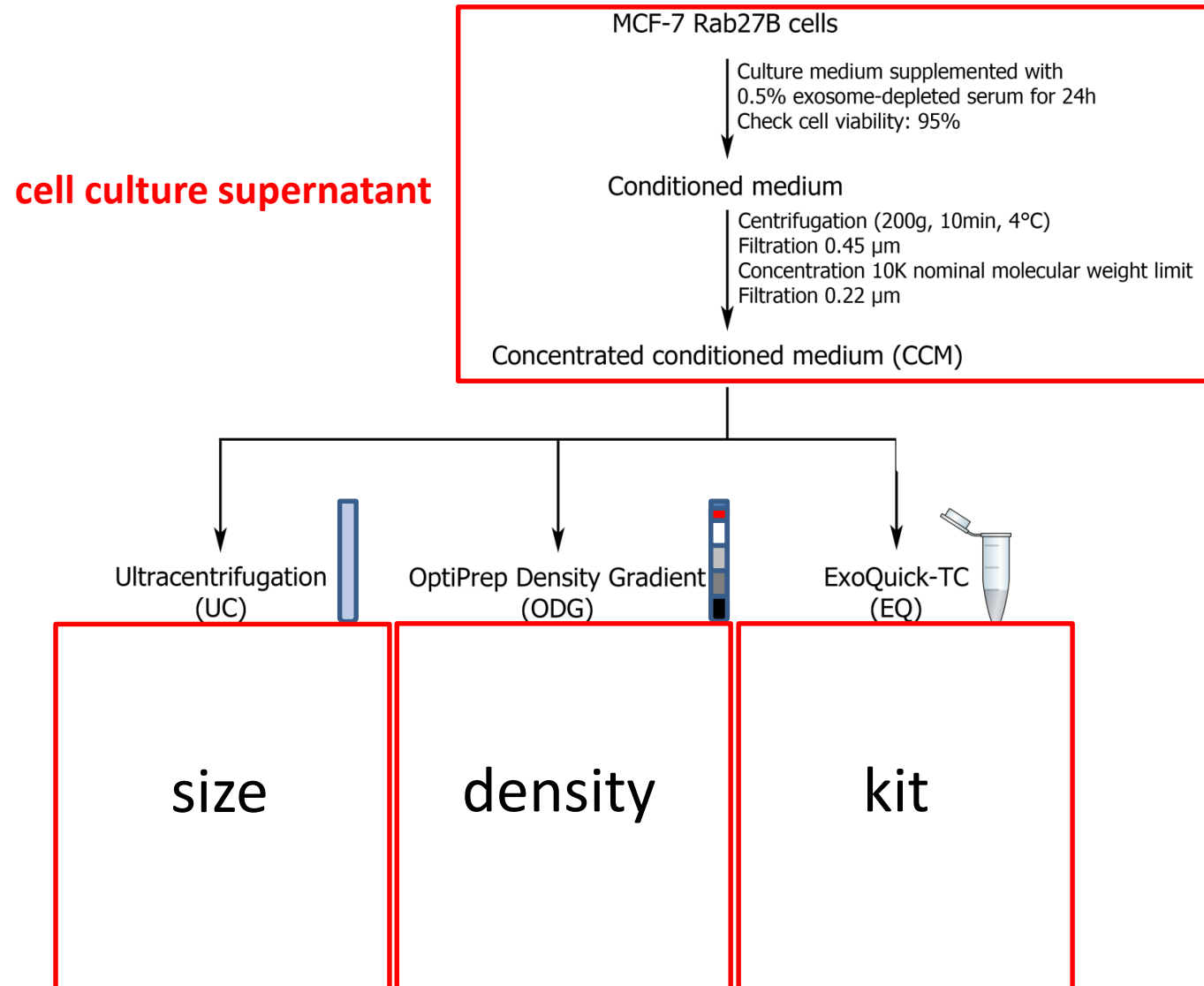
cell culture supernatant



Van Deun et al., Journal of Extracellular Vesicles, 2014

Hendrix et al., JNCI, 2010

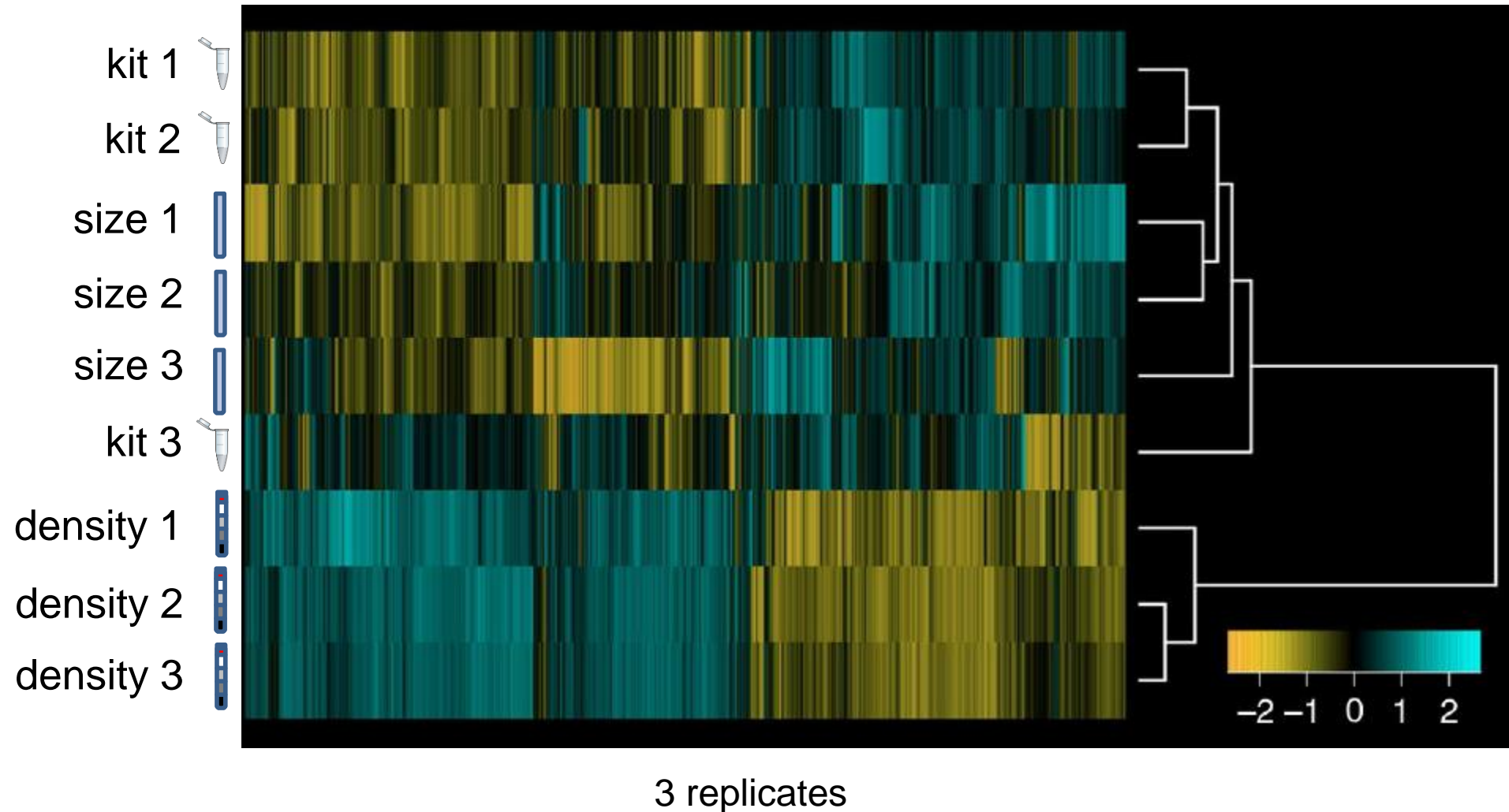
Do different EV isolation methods impact downstream RNA analysis?



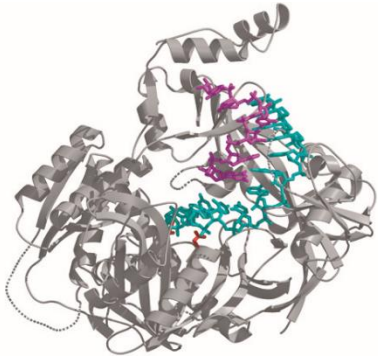
Van Deun et al., Journal of Extracellular Vesicles, 2014

Hendrix et al., JNCI, 2010

Density-based EV isolation reveals a reproducible but strikingly distinct RNA signature compared to other methods



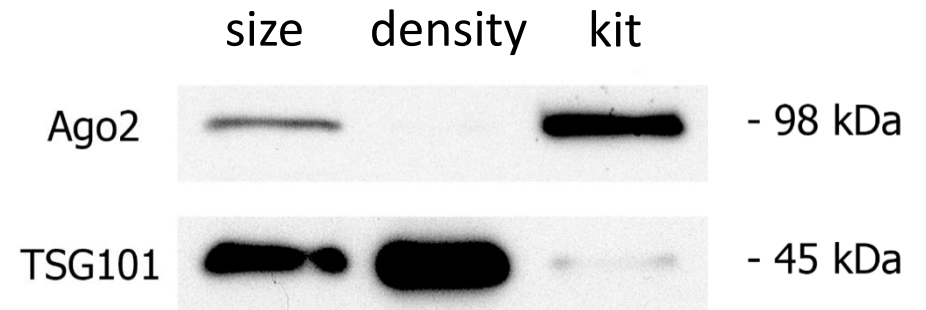
Density-based EV isolation reveals a reproducible but strikingly distinct RNA signature compared to other methods



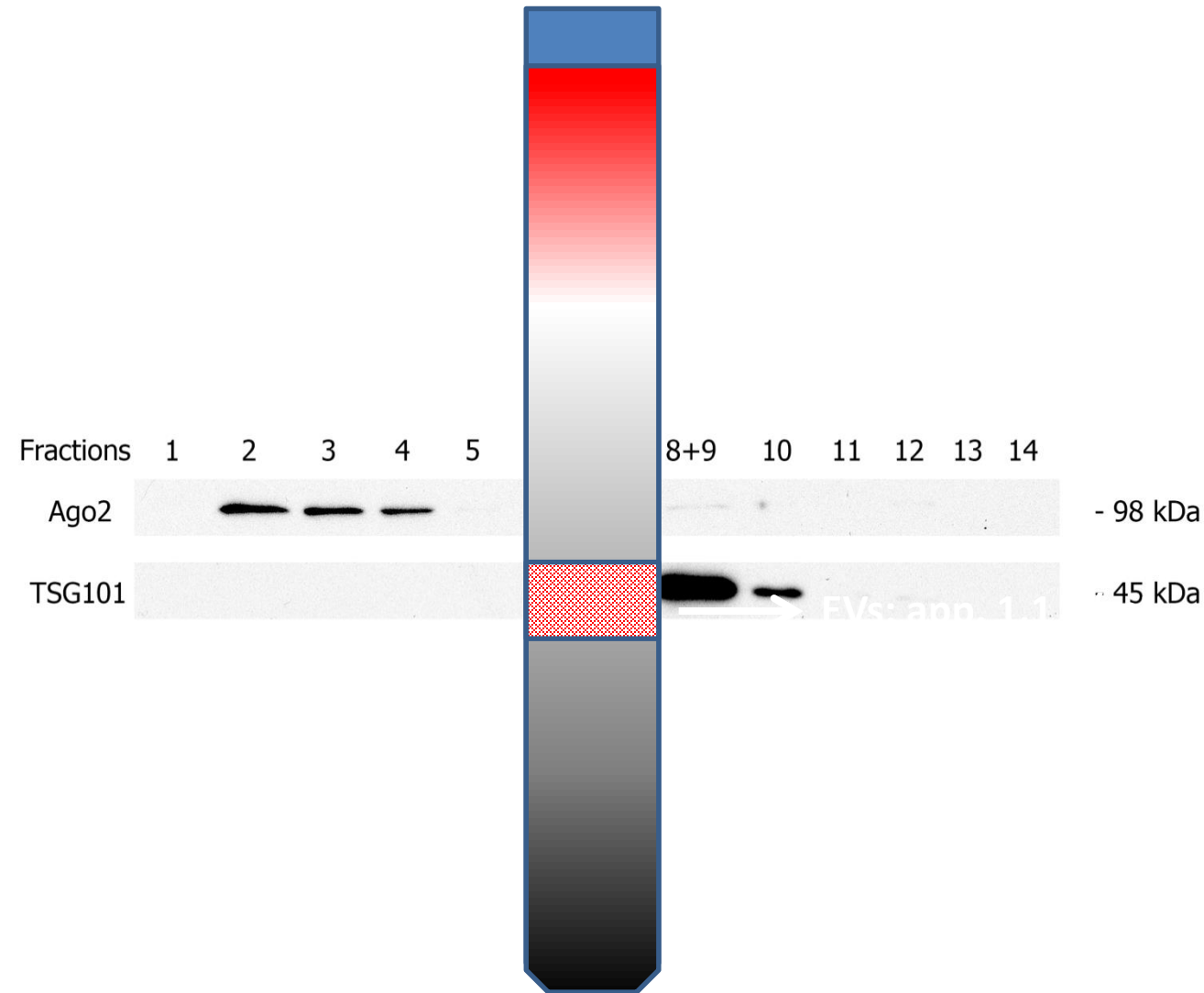
Hutvagner & Simard, 2008,
Nat Rev Mol Cell Biol

Ago2 complexes carry a population of circulating miRNAs independent of EVs in human plasma
(Arroyo et al., 2011, PNAS)

Argonaute-2 miRNA complexes



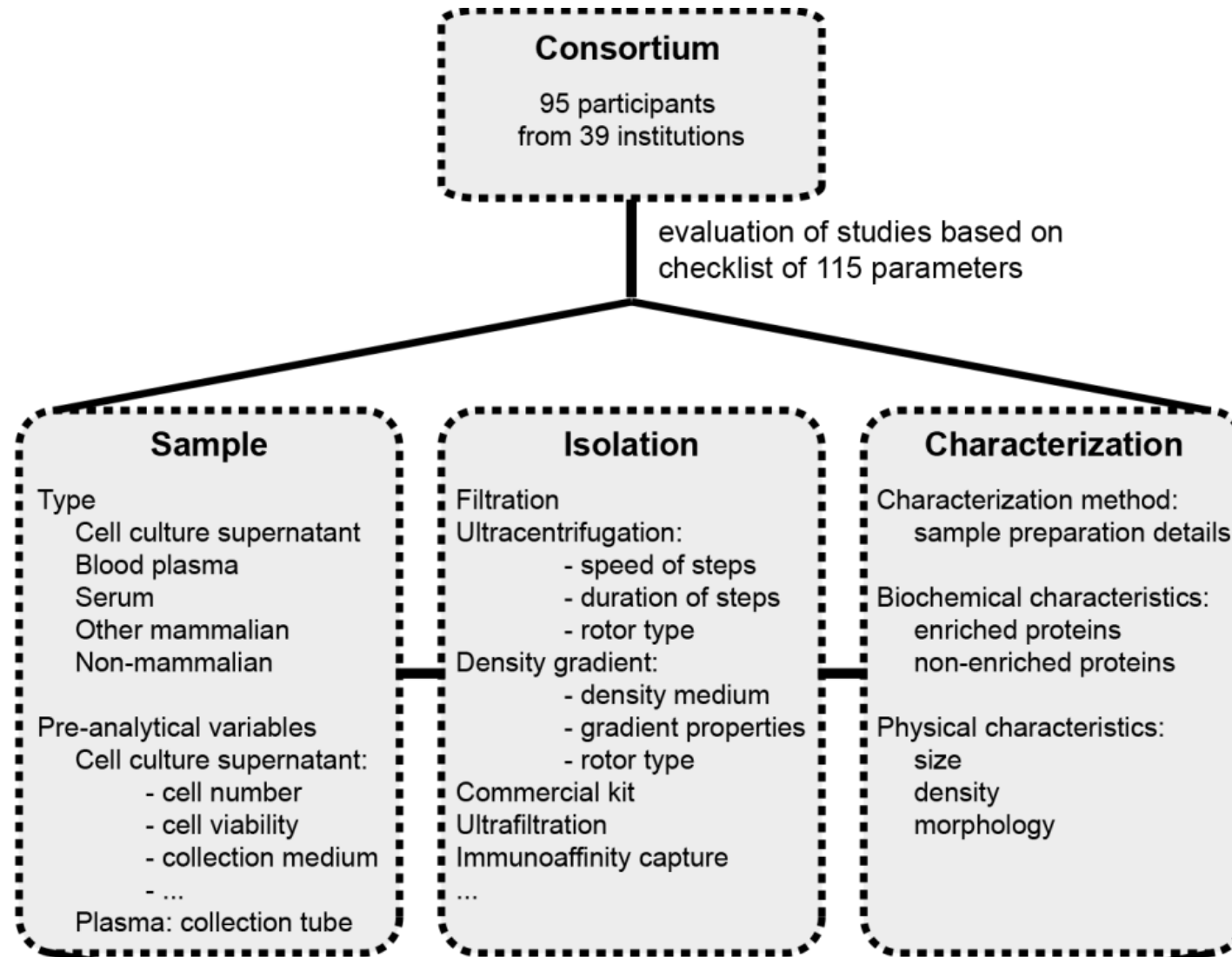
Density-based separation of Ago2 complexes from EV



Awareness of heterogeneity

Different isolation methods enrich for single or multiple EV subtypes with diverse composition and variable purity, thus identifying method-dependent EV content and function.

Systematic review

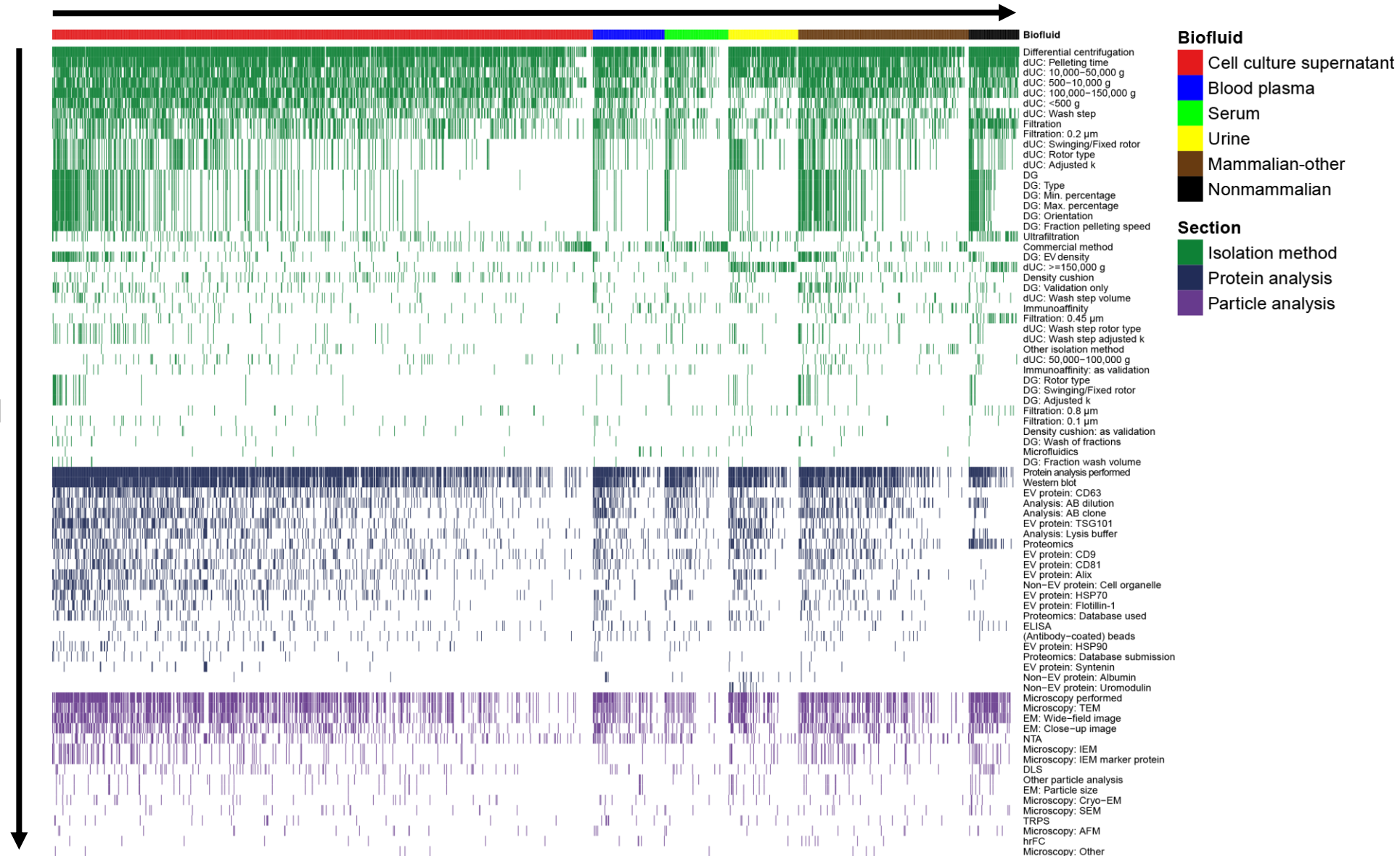


EV-TRACK consortium uploaded specifications of 1742 experiments from 1226 publications

Heterogeneity and lack of transparency

1226 publications

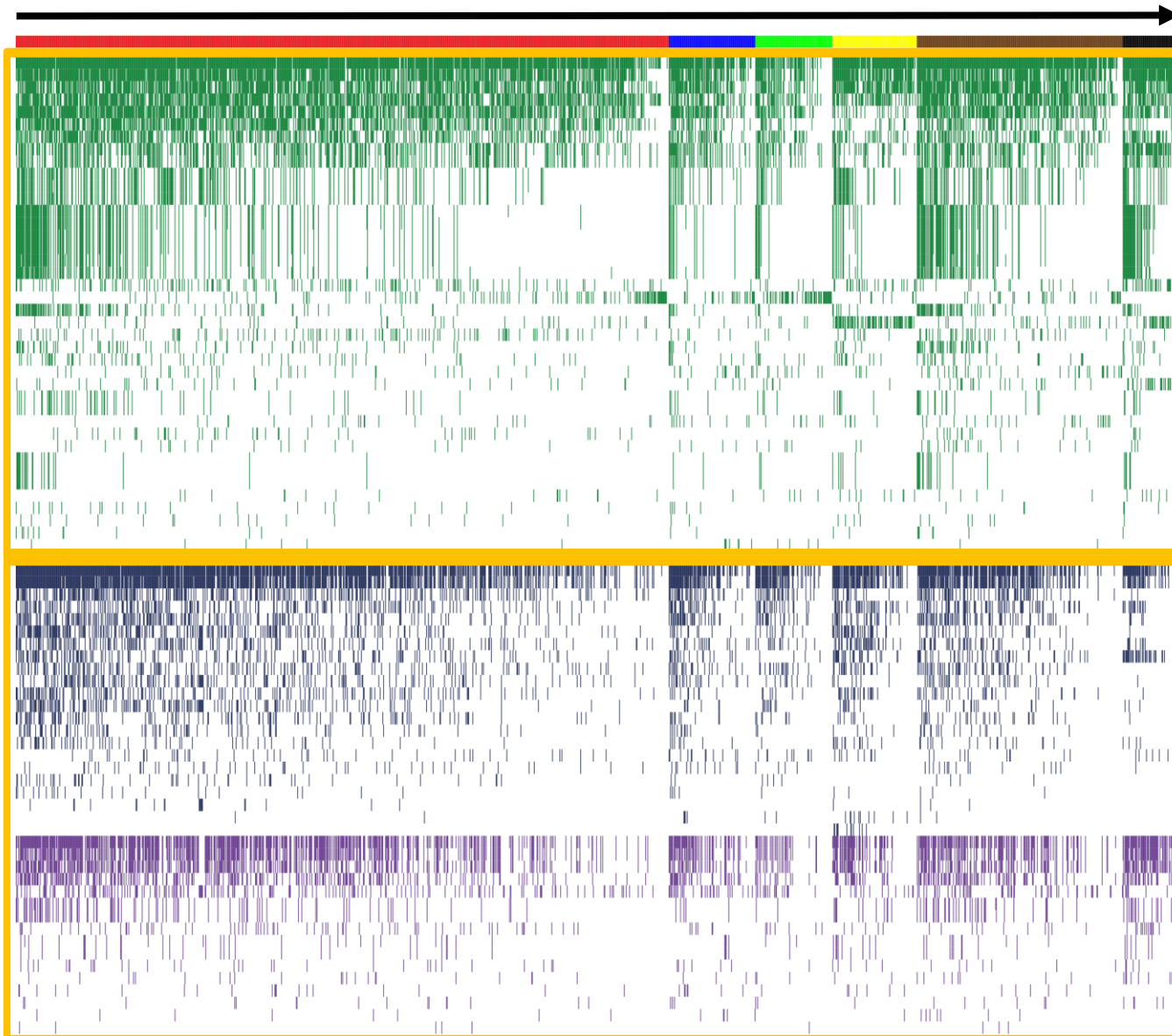
115
experimental
parameters



Van Deun et al., Nature Methods, 2017

Heterogeneity and lack of transparency

1226 publications



1. Heterogeneity:

1226 publications



1038 unique
isolation protocols

2. Inconsistent reporting:

17% provide no
characterization of
isolated EV

115
Experimental
parameters

Heterogeneity requires transparency

- Different isolation methods enrich for single or multiple EV subtypes with diverse composition and variable purity, thus identifying method-dependent EV content and function.
- The implementation of different methods requires validated controls and transparency. Failure to follow these principles can result in data that are difficult to interpret and reproduce.

Announcement: Transparency upgrade for Nature journals

The Nature journals continue journey towards greater rigour.

15 March 2017

NIH plans to enhance reproducibility

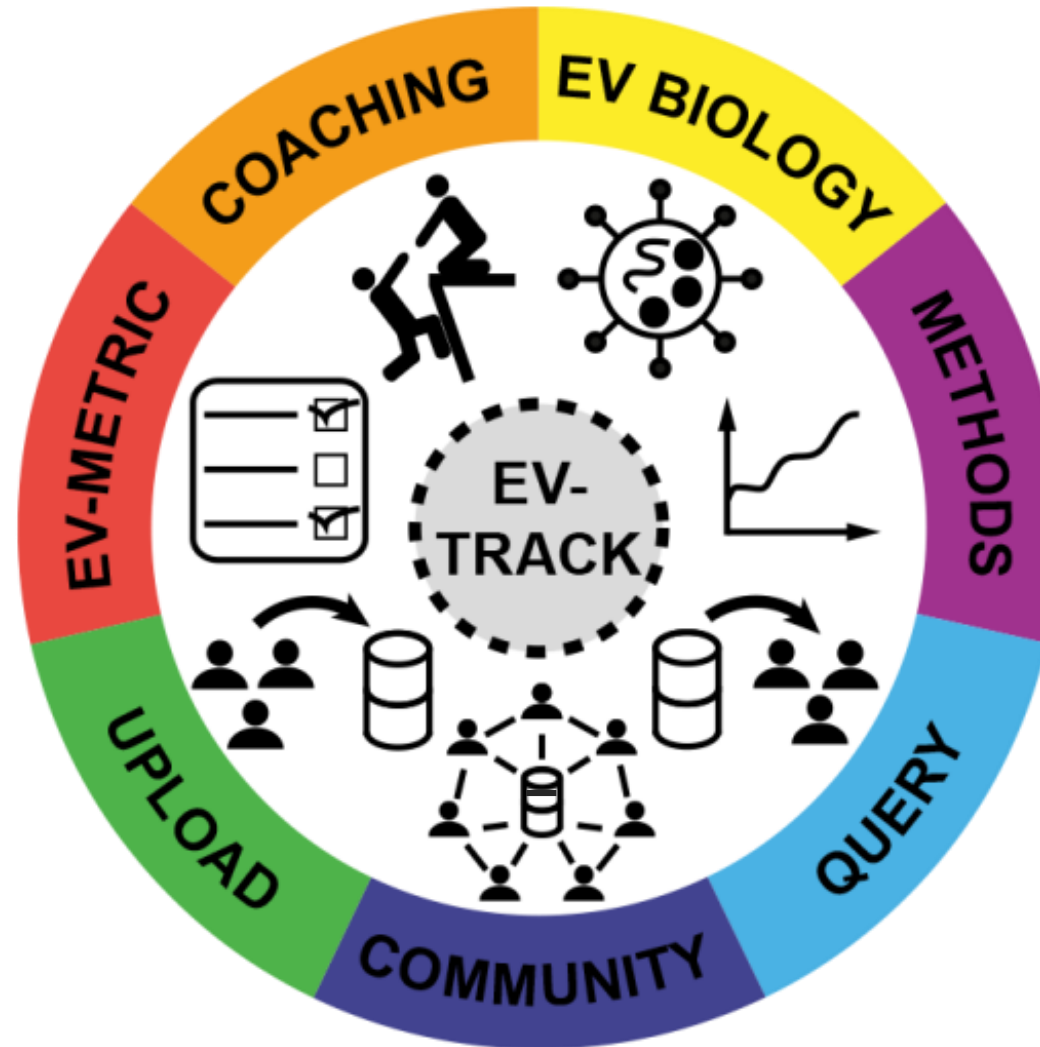
Institutions must do their part for reproducibility

“A useful framework for advancing an agenda for reproducible research”

EV-TRACK

Online toolset for transparent reporting and centralizing knowledge of extracellular vesicles

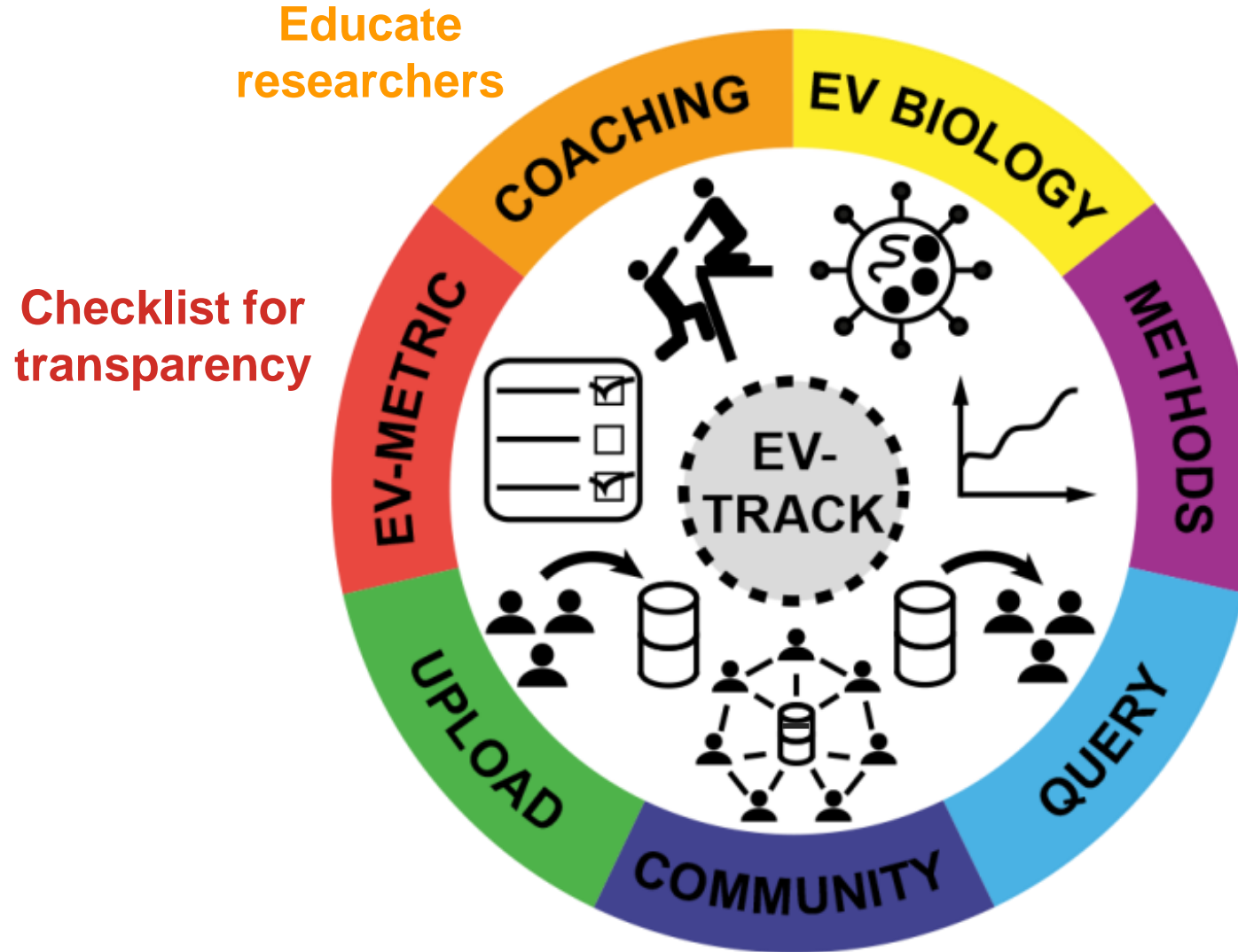
www.evtrack.org



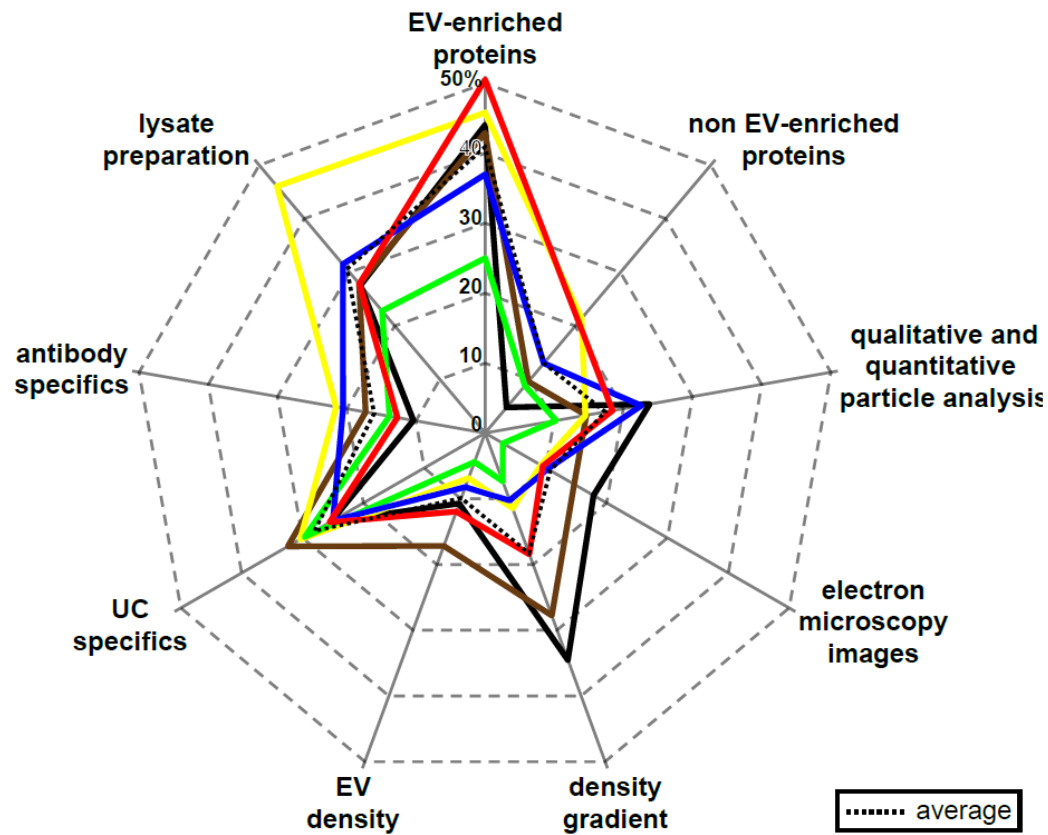
Van Deun et al., Nature Methods, 2017

EV-TRACK

Online toolset for transparent reporting and centralizing knowledge of extracellular vesicles



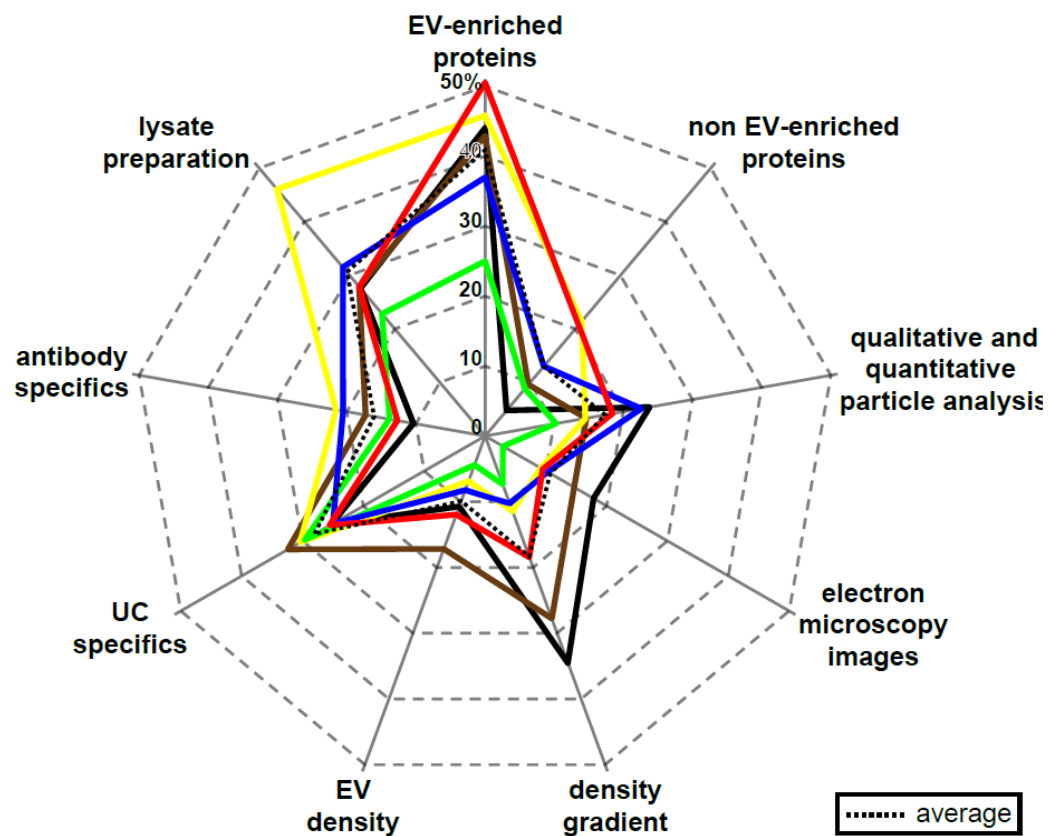
Percentage of experiments that adhere to each
of the respective EV-METRIC parameters



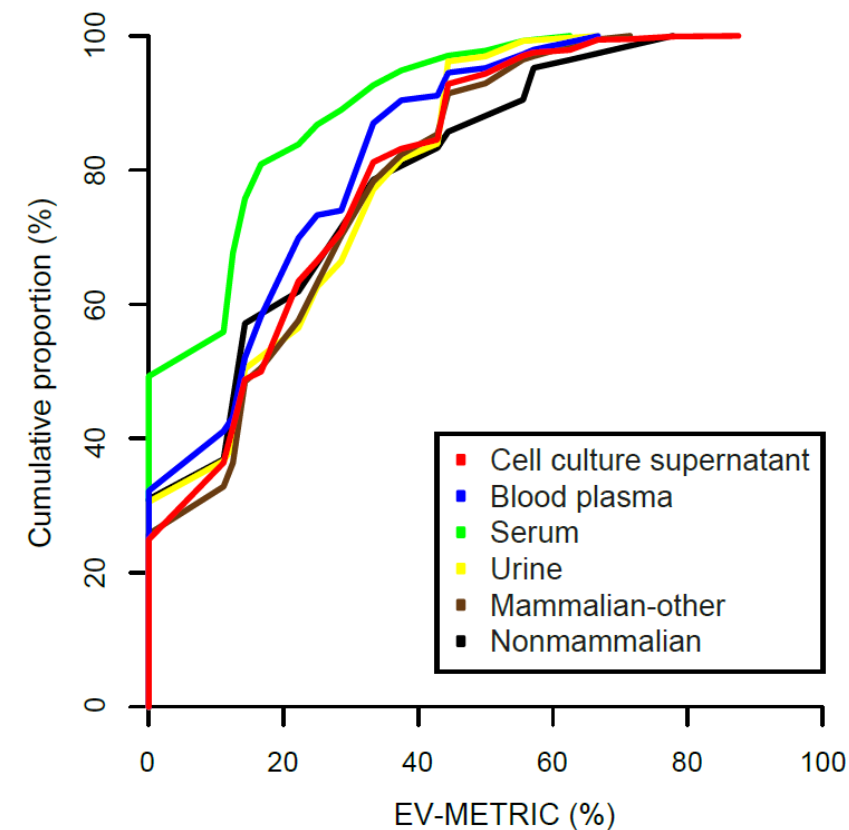
EV-METRIC

Measure Transparent Reporting of Isolation and Characterization methods for EV

Percentage of experiments that adhere to each of the respective EV-METRIC parameters



Cumulative proportion of experiments achieving a certain EV-METRIC



Study summary

Full title	Isolation of biologically active exosomes from human plasma
All authors	Müller L, Heng C, Stolz C, Müller C, Müller C, Müller C
Journal	J Immunol Methods
Abstract	Effects of exosomes present in human plasma on immune cells have not been examined in detail. Immuno (show more...)
EV-METRIC	67% (98th percentile of all experiments on the same sample type)

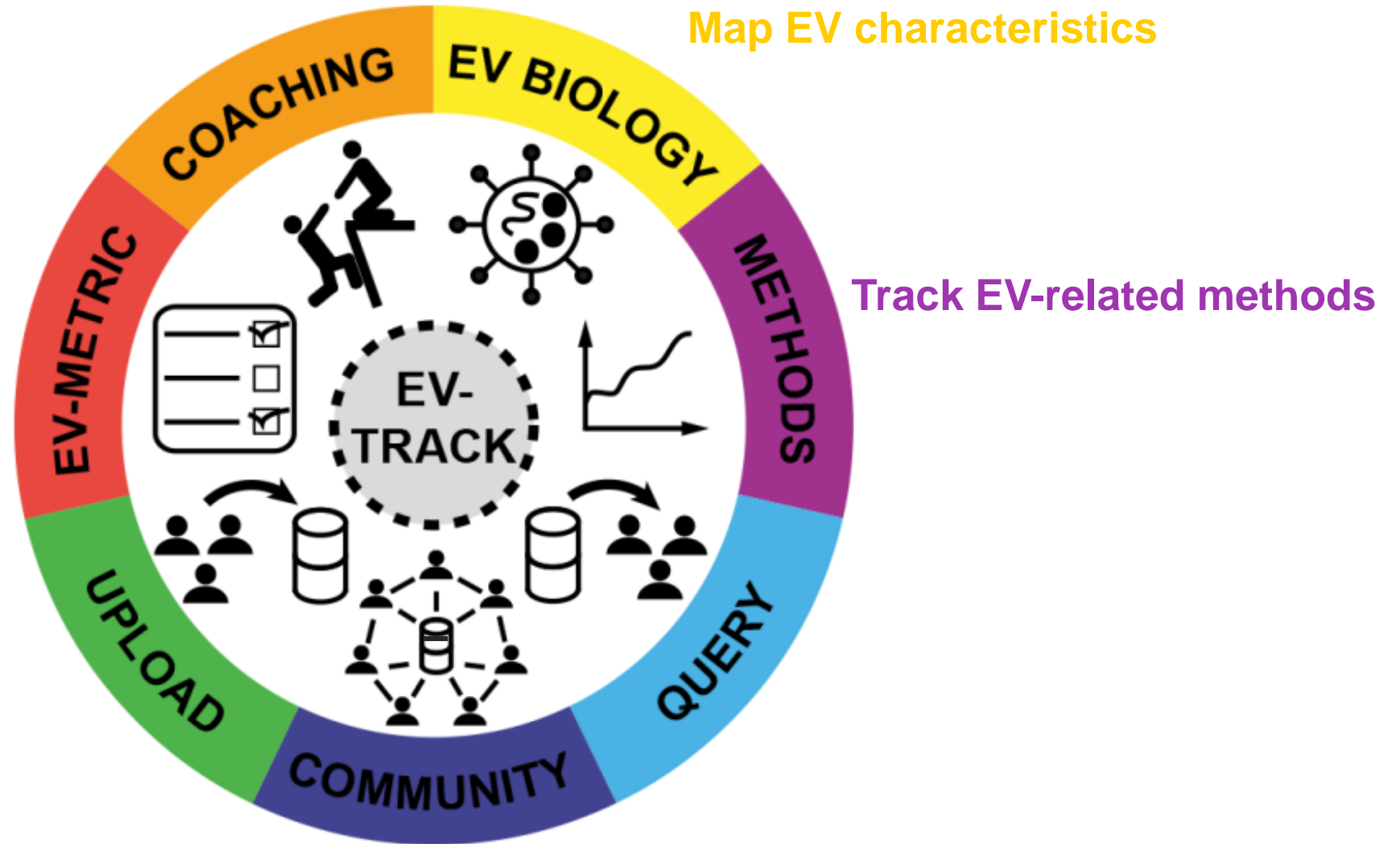
- Reported
- Not reported
- Not applicable

EV-enriched proteins	non EV-enriched protein	qualitative and quantitative analysis
electron microscopy images	density gradient	EV density
ultracentrifugation specifics	antibody specifics	lysate preparation

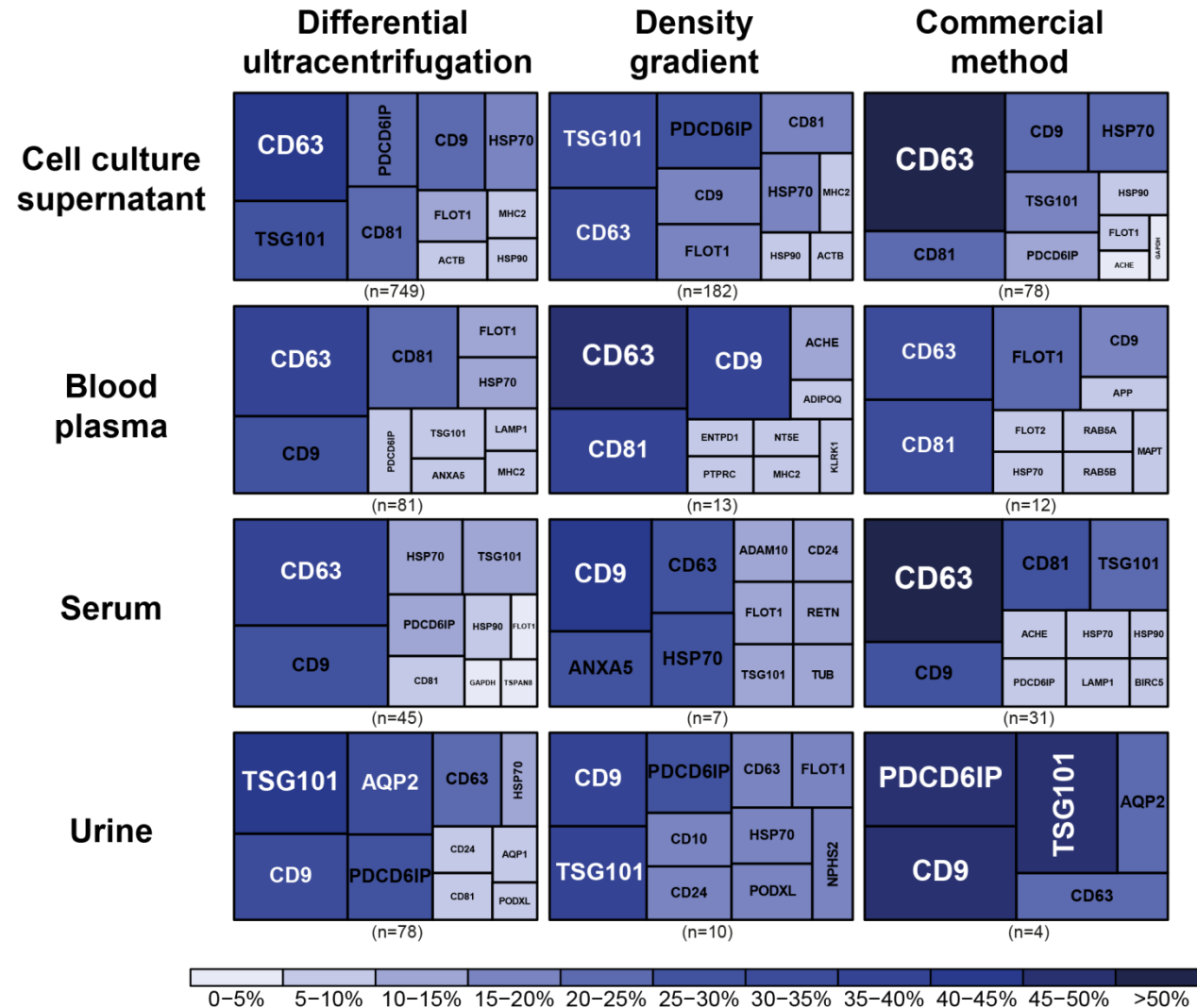
In 81% of experiments, an increase of the EV-METRIC would have been achieved by increased reporting, without additional analyses

EV-TRACK

Online toolset for transparent reporting and centralizing knowledge of extracellular vesicles

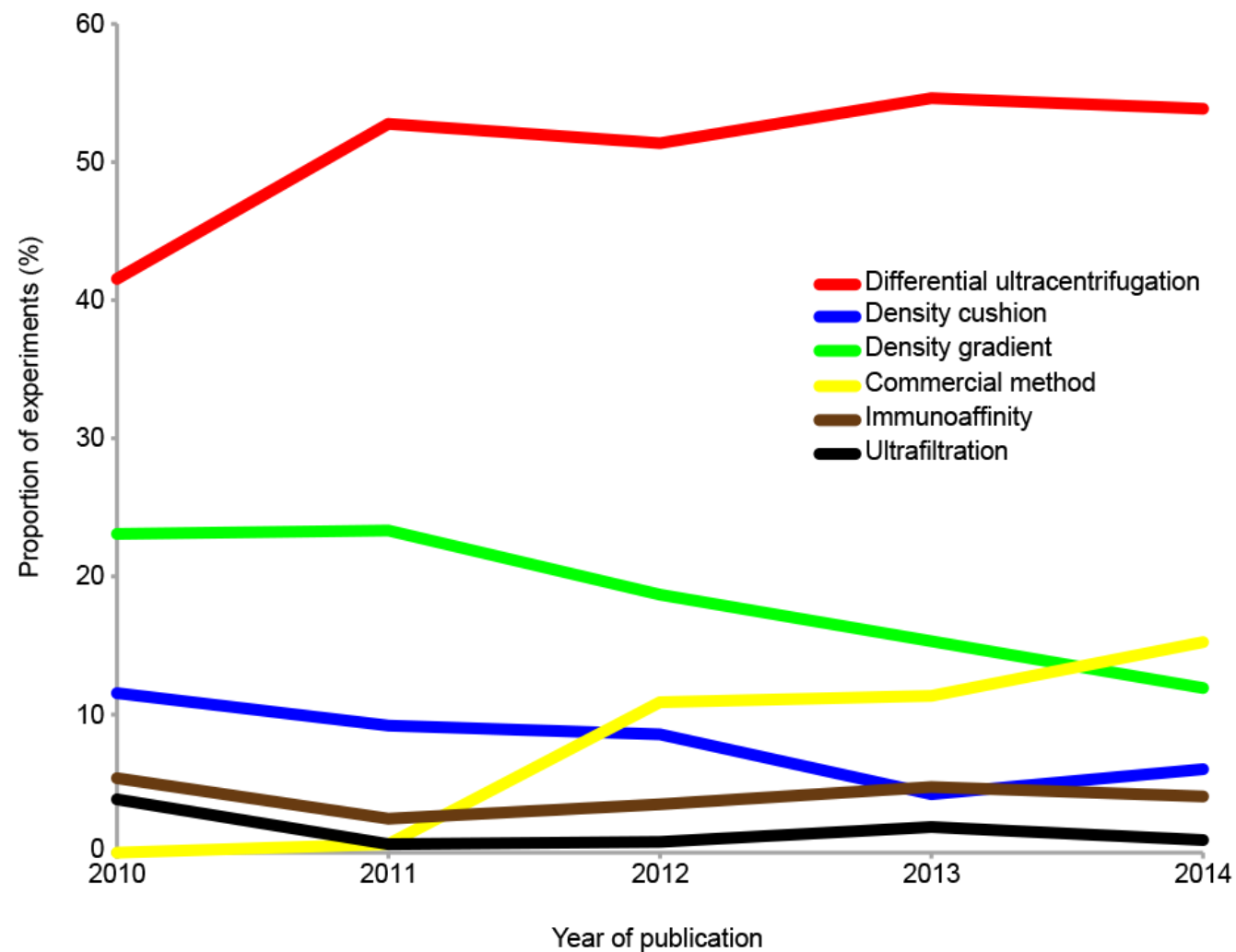


Map biochemical and physical properties to help characterize EV subtypes



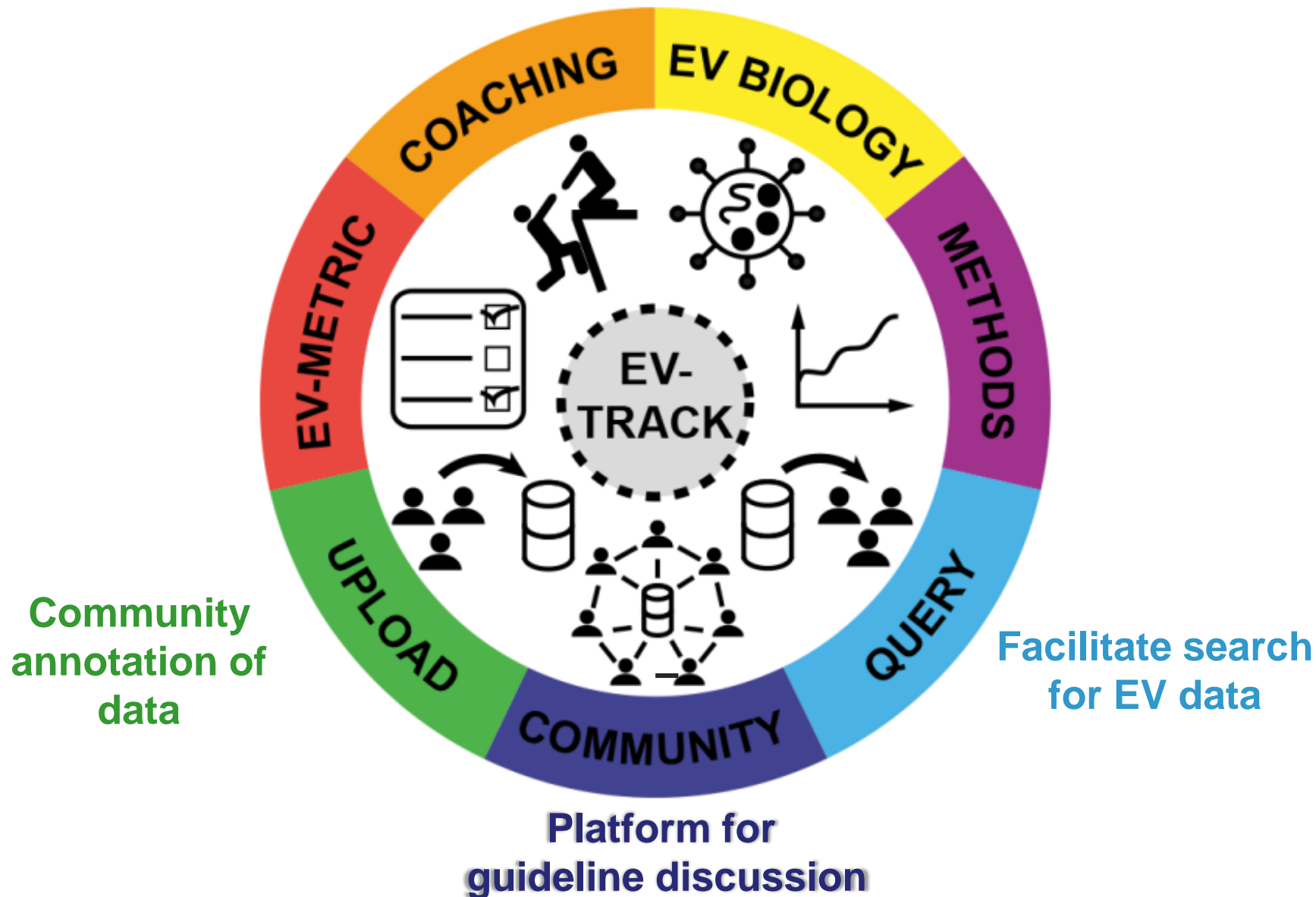
METHODS

Track EV isolation and characterization methods and include them in future guidelines




EV-TRACK

Online toolset for transparent reporting and centralizing knowledge of extracellular vesicles



QUERY

Facilitate the search for relevant isolation and characterization data of EV experiment



TRANSPARENT REPORTING AND CENTRALIZING KNOWLEDGE IN
EXTRACELLULAR VESICLE RESEARCH

[SEARCH](#)[ABOUT](#)[CONSORTIUM](#)[REVIEWERS & EDITORS](#)[MY EV-TRACK](#)

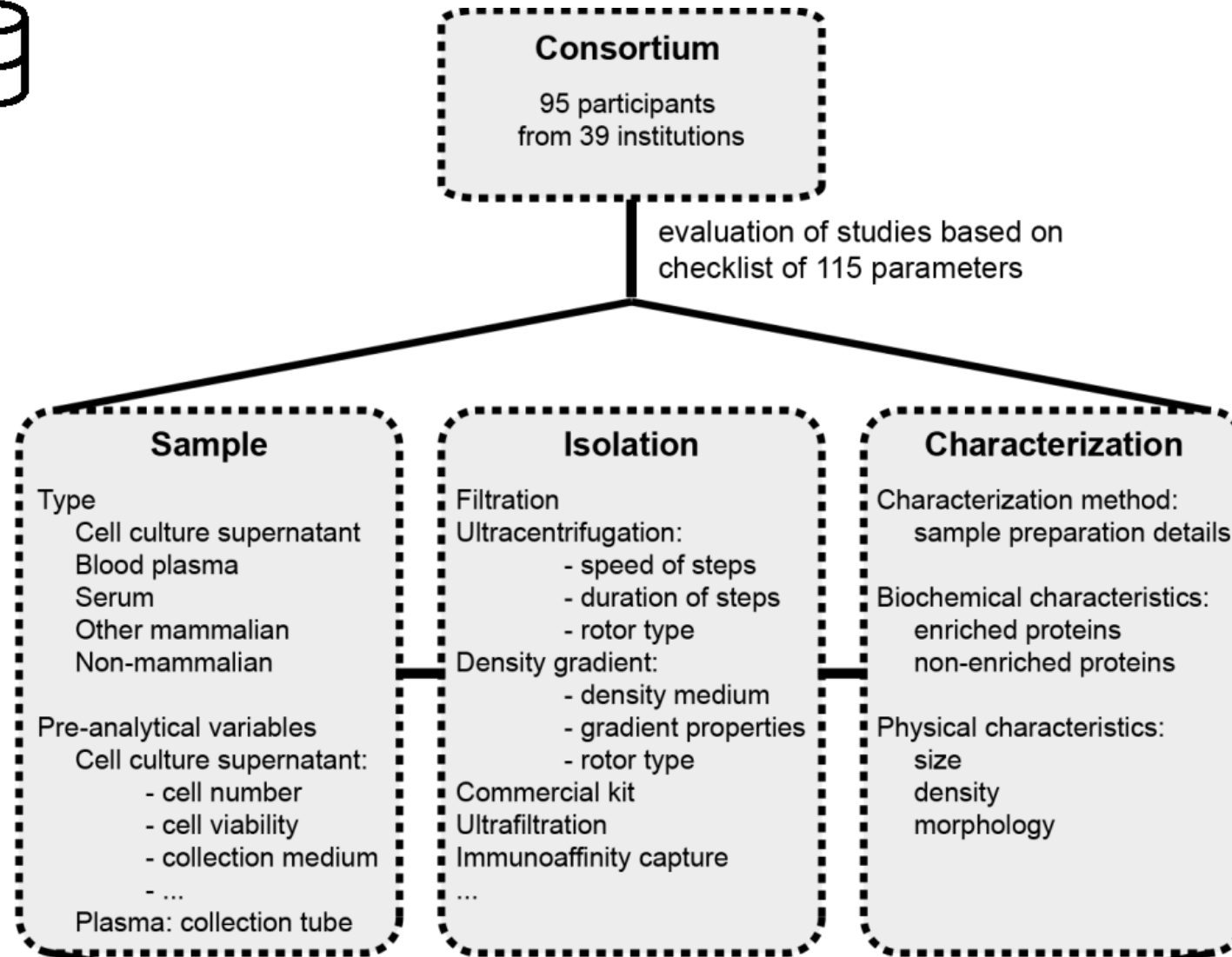
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<div>EV-METRIC</div> <div><input type="checkbox"/> EV-enriched protein</div> <div><input type="checkbox"/> electron microscopy images</div> <div><input type="checkbox"/> ultracentrifugation specifics</div>	<div><input type="checkbox"/> non EV-enriched protein</div> <div><input type="checkbox"/> density gradient</div> <div><input type="checkbox"/> antibody specifics</div>	<div><input type="checkbox"/> qualitative and quantitative analysis</div> <div><input type="checkbox"/> EV density</div> <div><input type="checkbox"/> lysate preparation</div>
<div>Biofluid</div>	<div>Study aim</div>	<div>Isolation method</div>
<div>Species</div>	<div>Protein analysis method</div>	<div>Keyword</div>
<div>Particle analysis method</div>	<div>Year of publication</div>	

SEARCH

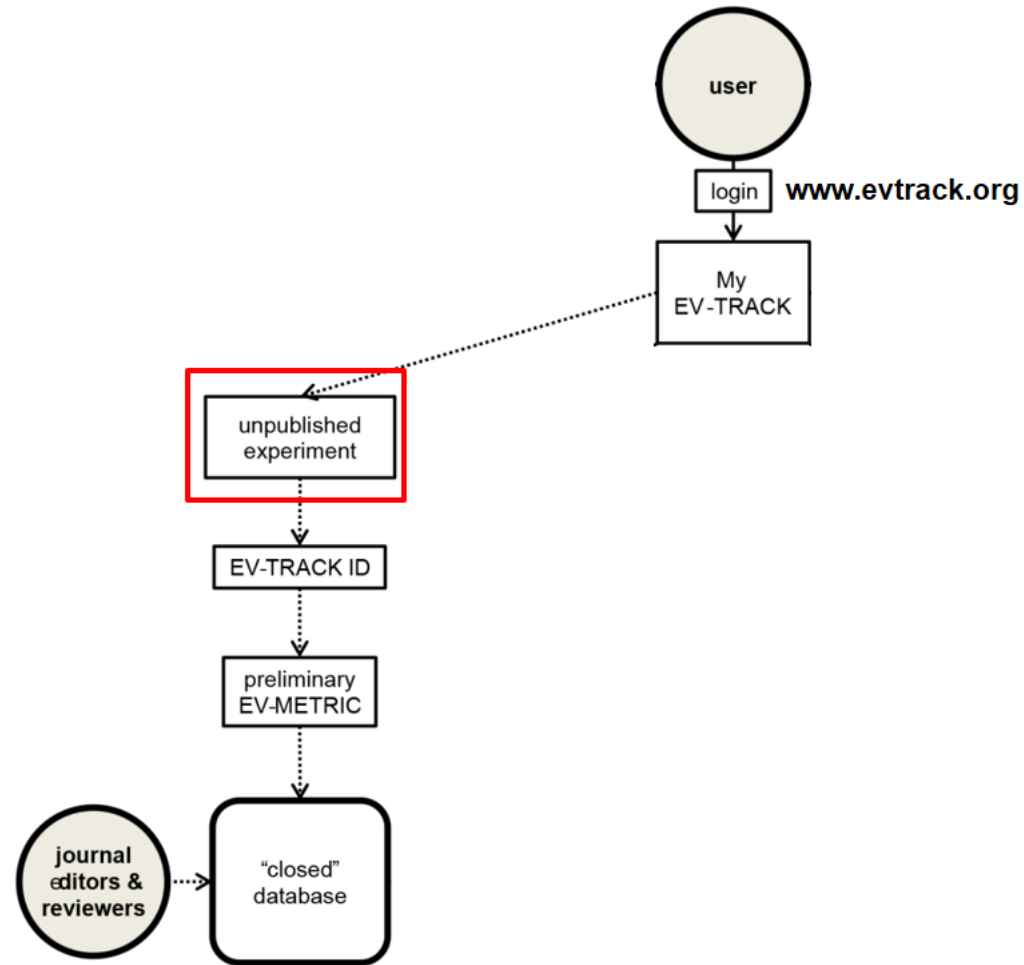
Easily search, download and analyze EV-related data

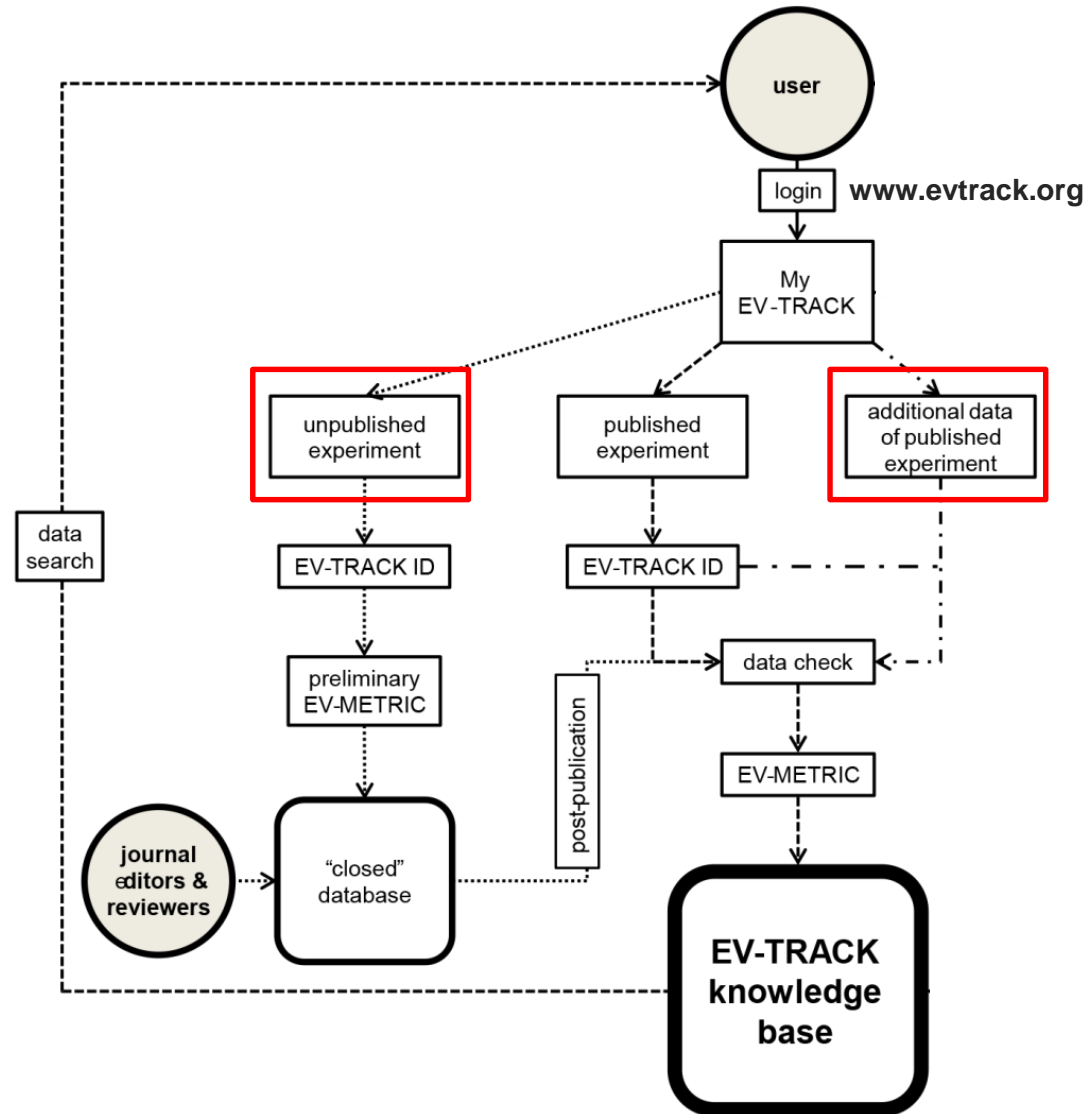
UPLOAD

Consortium annotation



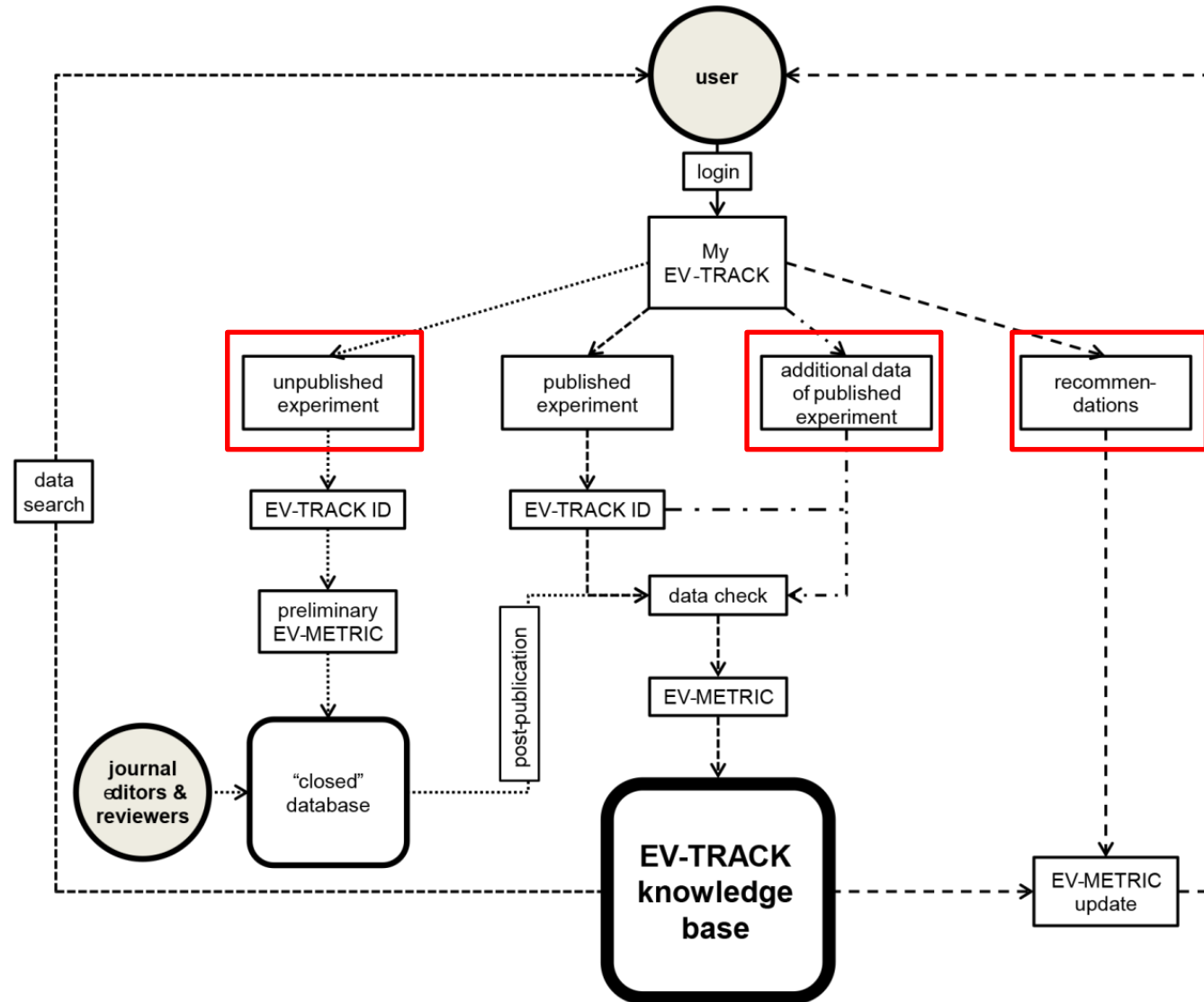
EV-TRACK consortium uploaded specifications of 1742 experiments from 1226 publications





COMMUNITY

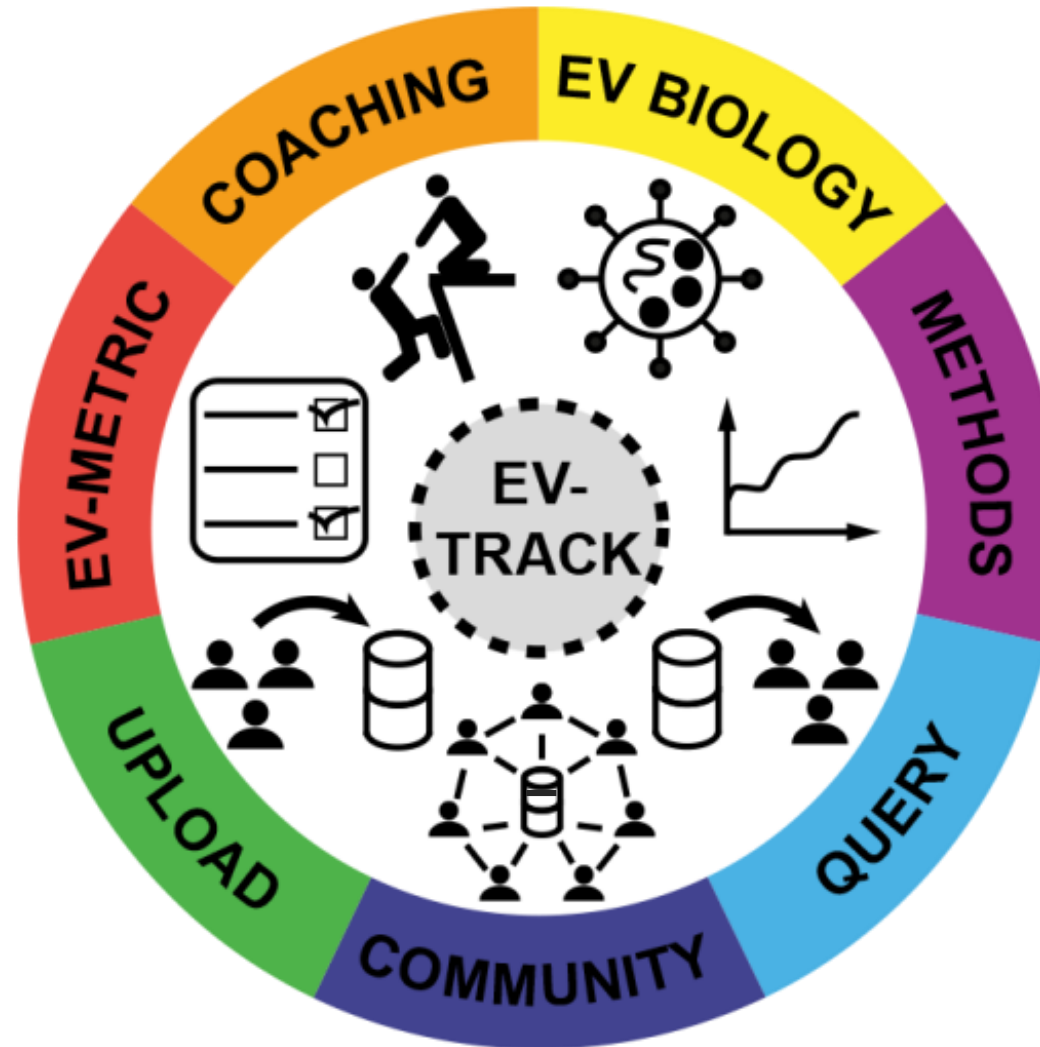
Invite users to discuss guidelines through an online forum and update platform accordingly



EV-TRACK

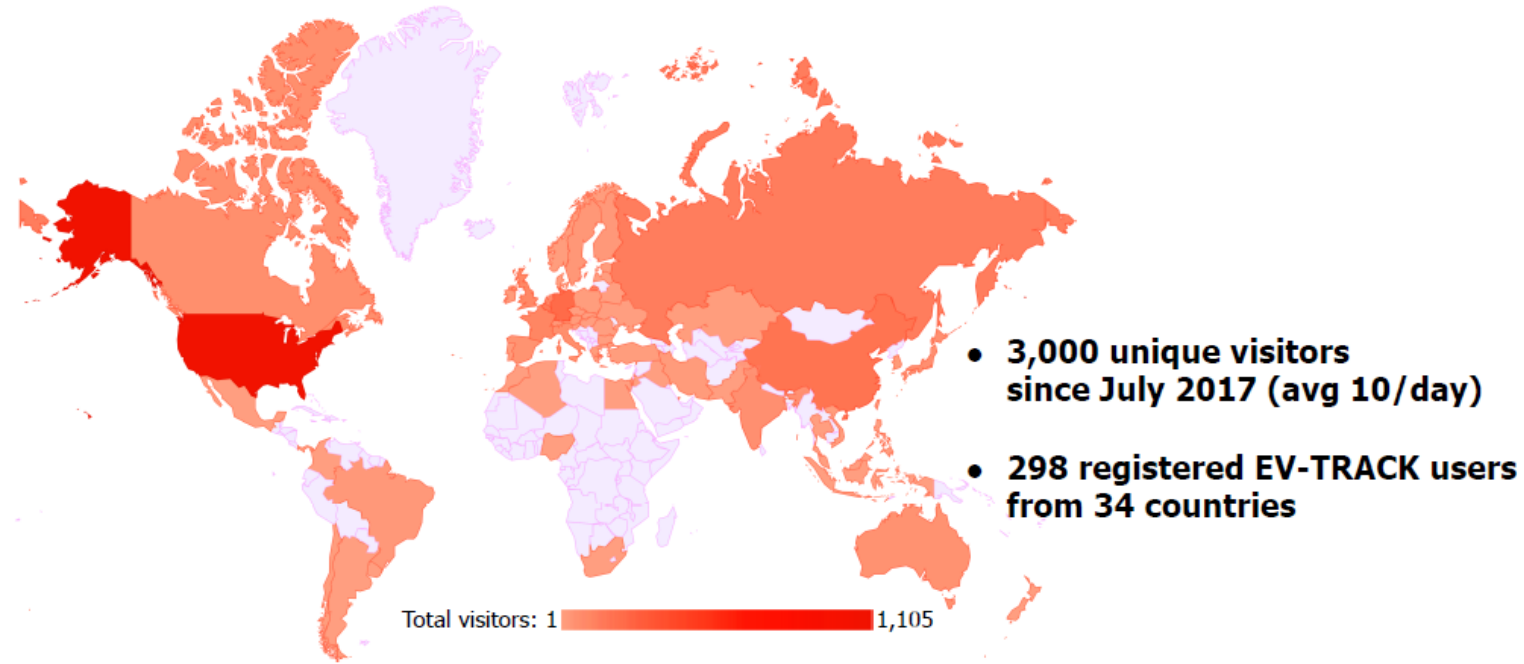
Online toolset for transparent reporting and centralizing knowledge of extracellular vesicles

www.evtrack.org



Van Deun et al., Nature Methods, 2017

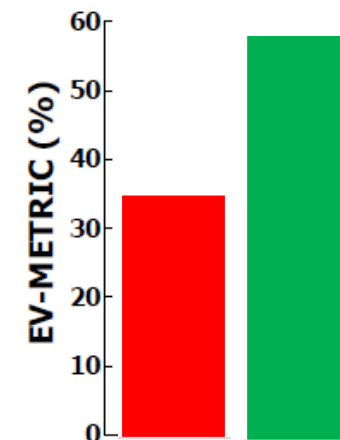
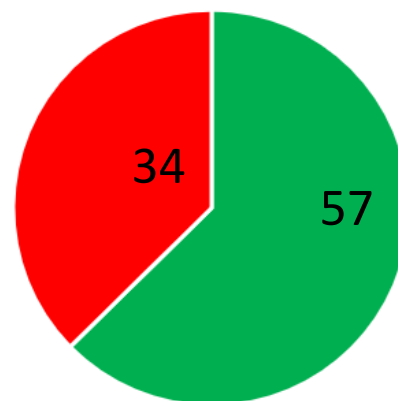
Implementation of EV-TRACK



■ pre-publication

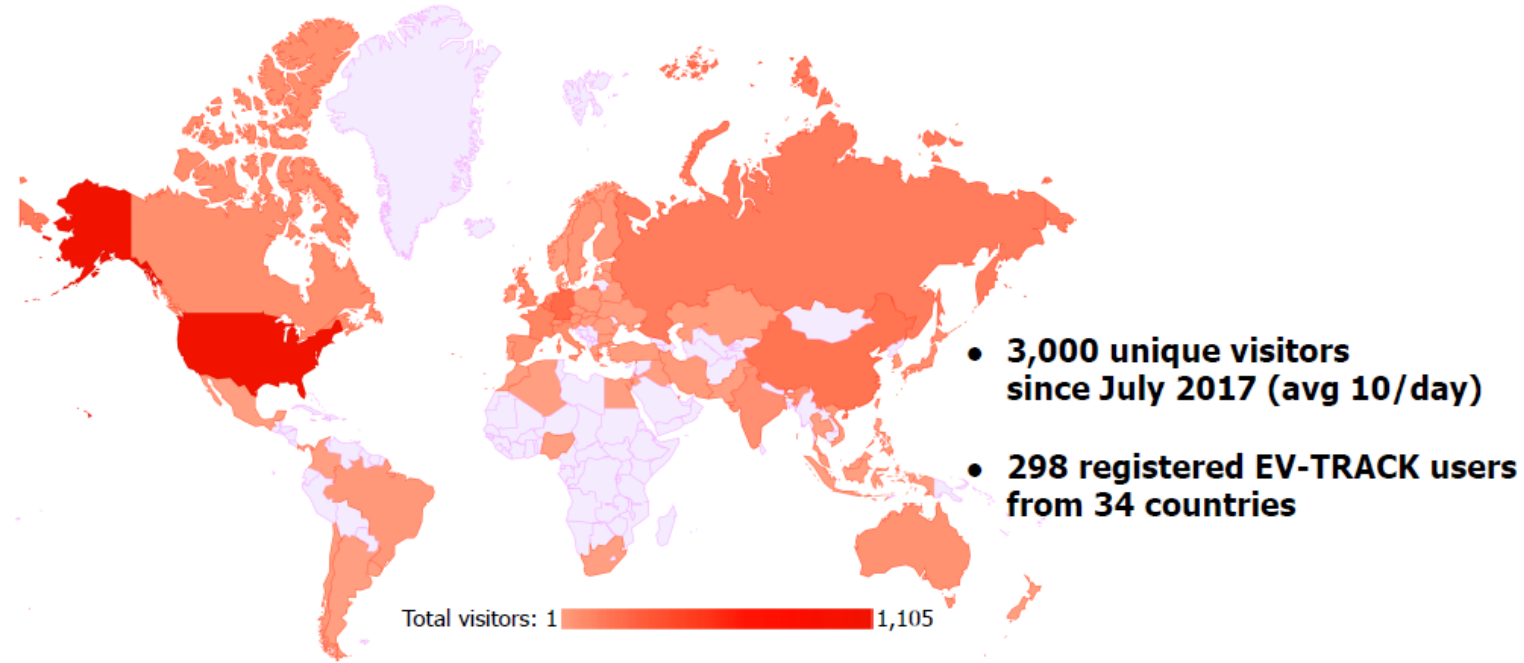
■ post-publication

Number of entries



- 91 new entries (comprising 211 experiments)
- 7 experiments: additional data added to increase transparency (rotor type, antibody details, lysis buffer)
- EV-METRIC is higher when adding data in the pre-publication stage

Implementation of EV-TRACK



Commentary “Is your article EV-TRACKed?”

ISEV workshops

EMBO courses

MISEV2018 update

Minimal Information for Studies of Extracellular Vesicles 2018 (MISEV2018): a position statement of the International Society for Extracellular Vesicles and update of the MISEV2014 guidelines

Clotilde Théry 91* and Kenneth W Witwer 193,194* (*Equal contributions and corresponding authors. *Clotilde.Thery@curie.fr and kwitwer1@jhmi.edu*), +380 co-authors

Major points of MISEV 2018:

5. The EV-TRACK knowledgebase is endorsed by ISEV to showcase and enhance rigor and reproducibility in EV studies consistent with the MISEV guidelines.

¹EV-TRACK submission and EV-METRIC scoring may assist with but do not replace appropriate peer review. Interestingly, respondents to the MISEV2018 survey were split between advocating mandatory EV-TRACK submission and reporting and recognizing EV-TRACK as a valuable but optional tool. As a result, MISEV2018 strongly encourages but cannot mandate EV-TRACK submission, which most seem to acknowledge as highly valuable.

Conclusion

**Driven by the EV research community,
EV-TRACK aims to stimulate EV research by
increasing experimental rigor and
centralizing our knowledge on EVs**

**EV-TRACK: transparent reporting and centralizing
knowledge in extracellular vesicle research**

EV-TRACK Consortium*



Extracellular Vesicles: From Biology to Biomedical Applications

EMBL COURSE

ADD TO
CALENDAR

TRAINING

CONFERENCES AND

LOCATION & DATES

EMBL Heidelberg, Germany
2 - 8 Jun 2019

DEADLINES

Application will open shortly



EMBO
Practical Course