

Appendix C: AIRR-C Sub-committee (SC) and Working Group (WG) Reporting Template

Instructions. This form is to be used for AIRR-C Meeting updates. The form should be completed by SC or WG (Co)-leaders, with input from other SC or WG members, and submitted to the Chair of the AIRR-C Executive SC at least one week prior to the AIRR-C Meeting.

Current

Date of this report: April 20, 2022

SC/WG Name: Biological Resources WG

SC/WG Co-leaders: Anne Eugster and Johannes Trück

SC/WG Active Members (list):

Houda Alachkar, Davide Bagnara, John Beckford, Anne Eugster (Co-lead), Nina Luning Prak, Encarnita Mariotti-Ferrandiz, Cinque Soto, Johannes Trück (Co-lead), Nidhi Gupta, Andrew Farmer, Shaveta Goyal, Theam Soon Lim, Wenming Xiao

Purpose: To provide the AIRR Community with biological calibrators and reagents for evaluation of AIRR-seq.

The Biological Resources Working Group is responsible for coordinating the development of reference samples that can be used as controls. The working group aims at reaching out to established organizations such as NIST and Genome in a Bottle, as well as companies to help encourage ease of use and broad adoption.

Goals:

The overarching goal of the working group is to be able to recommend a set of biological standards that can be used for normalization of data sets. Our specific aims are:

- Generate and share in-line and external standards for repertoire analysis
- Generate data using standards and different library prep methods
- Share data for standard method and analysis pipeline comparison and evaluation

Long-term vision and how WG products integrate with the AIRR-C mission:

The long-term aim of the Biological Resources WG is to provide AIRR biological standards and protocol recommendations to the scientific and biomedical community.

Products (if any):

Publication in eLife (Trück et al., 2021).

Chapters in Methods in Molecular Biology (accepted).

Grant application for methods comparison from TABS (awaiting final funding decision)

Resources (if any):

Controls (RNA templates, spleen sample DNA and RNA and cell lines) in preparation

Progress report on current purpose, goals, products and resources:

- The WG has led efforts to publish a paper on community opinions regarding needs and challenges for AIRR-seq standards and standardization (Trück et al., 2021).
- In addition, we have participated in the publication of several chapters in Methods in Molecular Biology, Vol. 2453, including 3 wet bench chapters, wet bench methods and a dry bench overview. These chapters provide detailed guidance to the community regarding current state-of-the art methods in AIRR-seq.
- WG members planned and submitted a grant application to compare different BCR sequencing methods using three different types of standards: synthetic RNA templates, spleen DNA/RNA and cell line mixtures.
- WG members are planning a similar effort for TCR sequencing standards comparison, starting from the methods that performed best in the Nature Biotechnology publication that was led by several of the WG members (Barennes et al., 2021).
- Members of the WG participated in the EuroClonality WG and meetings.
- In addition, members of the WG have joined a larger effort spearheaded by Wenming Xiao from the Food and Drug Administration called BCR-SEQC, in which several wet bench methods, standards and data analysis pipelines will be compared and evaluated. The overarching study objectives, quoted from Wenming Xiao, are to elucidate current limitations, address fundamental technical needs, provide standard reference samples and data sets, and establish best practices for constructing BCR repertoires from NGS data.

Proposed plans for the coming interval:

Purpose: To provide the AIRR Community with biological calibrators and reagents for evaluation of AIRR-seq.

The Biological Resources Working Group is responsible for coordinating the development of reference samples that can be used as controls. The working group plans to gain insights from established organizations such as NIST and Genome in a Bottle, as well as companies to help encourage ease of use and broad adoption.

Specific Goals for the Next Cycle:

- Generation of data from different BCR sequencing methods using three different types of standards: synthetic RNA templates, spleen DNA/RNA and cell line mixtures.
- Generation of data from TCR sequencing standards comparison, starting from the methods that performed best in the Nature Biotechnology publication that was led by several of the WG members (Barennes et al., 2021).

- Continued participation in FDA BCR-SEQC initiative
- Continue to participate in EuroClonality WG and meetings
- Generate data and publish a paper about sequencing depth and sample optimization for unique molecular identifiers (UMIs)

Products (if any):

- Data sets for BCR and TCR sequencing methods
- Recommendations for how to use standards in different AIRR-seq methods
- UMI paper

Resources (if any):

- Data sets for BCR and TCR sequencing methods
- Recommendations for how to use standards in different AIRR-seq methods

Long-term vision and how WG or SC products integrate with the AIRR-C mission:

The long-term aim of the Biological Resources WG is to provide AIRR biological standards and protocol recommendations to the scientific and biomedical community.

Proposed SC/WG Co-leaders for 2022-2023 Cycle:

Anne Eugster

Johannes Trück

Nina Luning Prak