Assessing Nucleic Acid Quality in Blood and Tissue Samples

Category:	**Quality Management**		
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1.0 PURPOSE

The purpose of this SOP is to establish standardized procedures for assessing the quality of nucleic acids (DNA and RNA) extracted from blood and tissue samples at Nourah's Tissue Biobank. Accurate quality assessment ensures that nucleic acids meet the required standards for downstream applications in research.

2.0 SCOPE

This SOP applies to all nucleic acids extracted from blood and tissue samples at Nourah's Tissue Biobank. It covers DNA and RNA quality assessment using spectrophotometric and fluorometric methods, as well as integrity checks for RNA.

3.0 ROLES AND RESPONSIBILITIES

This SOP applies to all personnel of Nourah's Tissue Biobank members

Biobank Personnel	Responsibility
Biobank Manager	Oversees the process, reviews documentation, and ensures that samples meet quality standards before storage or distribution.
Lab Technologist	Responsible for performing nucleic acid extraction, conducting quality assessments, and documenting results.

4.0 MATERIALS, EQUIPMENT, AND FORMS

Listing of the materials, equipment, and forms being used to achieve the goals of the SOP, this list will mainly contain necessary materials and, or recommendations that may be substituted by alternative or equivalent materials more suitable at the time of testing.

Material to be used	Site

5.0 POTENTIAL HAZARDS

In this part of the SOP, we explain the potential hazards from chemicals and methodologies used in this procedure. It will also contain information on how to handle these chemicals and the level of biosafety

Material	Safety and handling

6.0 PROCEDURES

6.1 SAMPLE PREPARATION

1. Extract DNA from blood or tissue samples following the appropriate biobank extraction protocol. (SOP 04.006 - Blood Derivatives: Extraction of DNA) & (SOP 04.012 - Tissue Derivatives – Extraction of DNA).
2. Ensure that samples are free from contaminants and processed using validated methods.
3. Extract RNA from blood or tissue samples following the appropriate biobank extraction protocol. (SOP 04.005 - Blood Derivatives: Extraction of RNA) & (SOP 04.013 - Tissue Derivatives – Extraction of RNA).
4. Handle RNA samples carefully to prevent degradation and maintain sample integrity.

6.2 DNA QUALITY ASSESSMENT

1. Use a spectrophotometer to measure the absorbance of the DNA sample at 260 nm and 280 nm.
2. Calculate the A260/A280 ratio:
    a. Acceptable Range: 1.8 – 2.0 for high-purity DNA.
    b. Deviation: Ratios outside this range may indicate contamination with proteins or other impurities.
3. Concentration Measurement:
    a. Measure DNA concentration using a fluorometer with a DNA-specific fluorescent dye.
    b. Document the concentration in ng/µL.
4. Record all measurements in the DNA Quality Assessment Log (Appendix A).
5. If the sample does not meet quality standards, it may be re-purified or rejected, and the corrective action documented.

6.3 RNA QUALITY ASSESSMENT

1. Use a spectrophotometer to measure the absorbance of the RNA sample at 260 nm and 280 nm.
2. Calculate the A260/A280 ratio:
    a. Acceptable Range: 2.0 – 2.2 for high-purity RNA.
    b. Deviation: Ratios outside this range may indicate contamination with proteins or other impurities.
3. Concentration Measurement:
    a. Measure RNA concentration using a fluorometer with an RNA-specific fluorescent dye.
    b. Document the concentration in ng/µL.
4. Record all measurements in the RNA Quality Assessment Log (Appendix B).
5. If the sample does not meet quality standards, document corrective actions such as re-extraction or re-purification.

7.0 REFERENCES

1. ISO 20387:2018 – General requirements for biobanking.
2. Internal policies of Princess Nourah bint Abdulrahman University.

8.0 REVISION HISTORY

SOP No.	Date Revised	Author	Summary

9.0 APPENDICES

Appendix A – DNA Quality Assessment Log

Appendix B - RNA Quality Assessment Log