

 (Web Link)	National Biobank Consortium of Taiwan Standard Operating Procedure		No.: NBCT SOP-006
	Title: NBCT Blood Specimen Processing Process		Version/Total Pages: No. 1.1 / 5 pages
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1. Purpose

“National Biobank Consortium of Taiwan” (hereinafter referred to as the “Integration Platform”) primarily integrates domestic human biobanks — their data, biospecimens, and related information (hereinafter referred to as “Integration Platform biospecimen data”) — through a cloud-based system, making them available for application and use by medical, clinical, industry, and related biomedical research investigators nationwide. To achieve cross-institutional collaboration, it is necessary to establish consistent quality standards for dispensed biospecimens and consistent clinical data content. To maintain good specimen quality and to ensure consistency in the steps for blood specimen collection, so as to facilitate future related research, this Standard Operating Procedure is hereby established.

2. Scope of Application

This SOP applies to the process of blood specimen collection and aliquoting.

3. Responsibilities

All human biobanks that have joined the Integration Platform, when collecting and aliquoting human blood specimens, are recommended to follow this Standard Operating Procedure.

4. Description

This SOP can be divided into two stages

1. Blood specimen collection
2. Blood specimen aliquoting

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5. Operating Procedures

5.1 Blood Specimen Collection

Equipment:

4°C freezer

Consumables:

1. Yellow safety-cap blood collection tube, 8.5ml (Tube SST II.PLH 8.5ml) (abbreviated as “serum tube”)
2. EDTA anticoagulant vacuum blood collection tube, 10ml (EDTA K2 10ml) (abbreviated as “CBC tube”)
3. 10ml plastic syringe
4. 22-gauge needle
5. Stainless steel tube rack (for holding blood collection tubes)

Procedure:

After obtaining case consent, first prepare the blood collection tubes for the blood specimen to be preserved, affix pre-numbered freeze-resistant labels, and have medical staff draw 10-15ml of blood specimen from the case using a blood collection needle, then aliquot it at 5-7.5ml per tube separately into the serum tube and CBC tube.

Precautions:

1. Because collecting blood specimens involves many variables, handling must be adapted to the actual situation, and must always follow the patient's wishes.
2. For the CBC tube that has already had the blood specimen drawn into it, gently invert it up and down so that the blood mixes thoroughly with the EDTA K2 anticoagulant in the tube, then place it on the stainless steel tube rack and let it stand in the 4°C freezer for one hour.
3. For the serum tube that has already had the blood specimen drawn into it, there is no need to shake it — simply place it directly on the stainless steel tube rack, and let it stand in the 4°C freezer for one hour.

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5.2 Blood Specimen Aliquoting

Equipment:

1. -80°C freezer
2. Microprocessor-controlled large-capacity high-speed centrifuge

Consumables:

1. Sterilized 1.5ml microcentrifuge tubes (eppendorf); the number of 1.5ml microcentrifuge tubes required will vary depending on the volume of blood specimen collected.
2. Microcentrifuge tube rack (for holding 1.5ml microcentrifuge tubes)
3. Stainless steel tube rack (for holding blood collection tubes)
4. 3 ml dropper /or pipetman (pipetman)
5. Specimen storage box (9x9 grid)
6. Freeze-resistant labels

Procedure:

1. Prepare several 1.5ml microcentrifuge tubes. On each microcentrifuge tube's lid and side, write the specimen number and specimen type. (S represents serum; P represents plasma; C represents buffy coat)
2. Place the blood collection tubes, after standing for one hour, into the microprocessor-controlled large-capacity high-speed centrifuge, and centrifuge at 3,000 rpm for 10 minutes.
3. Using a 3 ml dropper (or a pipetman), draw off the supernatant from the centrifuged serum tube (this is the serum), and aliquot it at 100ul –1ml per tube into the pre-numbered 1.5ml microcentrifuge tubes. The aliquot volume may be determined according to the needs of each biobank; it is recommended not to exceed 1ml. Retain the serum tube after drawing off the supernatant — do not discard it immediately.
4. Using a 3 ml dropper (or a pipetman), draw off the supernatant from the centrifuged CBC tube (this is the plasma), and aliquot it at 100ul –1ml per tube into the pre-numbered 1.5ml
5. microcentrifuge tubes. The aliquot volume may be determined according to the needs of each biobank; it is recommended not to exceed 1ml. Using the same 3 ml dropper (or pipetman) from step 4, draw off the middle layer below the plasma of the centrifuged tube (this is the buffy coat (buffy coat)), and aliquot it

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6. at 100ul –1ml per tube into the pre-numbered 1.5ml microcentrifuge tubes. The aliquot volume may be determined according to the needs of each biobank; it is recommended not to exceed 1ml. After drawing off the supernatant and the middle layer
7. Arrange the microcentrifuge tubes containing aliquoted serum, plasma, and buffy coat sequentially by specimen number in a 9 × 9 specimen storage box. Label both the lid and side of the box with the specimen numbers and specimen type. Store the box, together with the original serum tubes and CBC tubes retained after aliquoting the supernatant, in a –80°C freezer.

Notes:

1. Verify the accuracy of all specimen numbers throughout the entire procedure.
2. Retain the serum tubes after removal of the supernatant. Do not discard them until it has been confirmed that a sufficient quantity of DNA has been extracted from the buffy coat. A substantial amount of DNA can still be recovered from the coagulated material remaining in the lower portion of these tubes; however, the extraction procedure is complex and time-consuming and is generally not considered worthwhile.

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6. Quality Standards for Dispensing

Blood specimens (serum, plasma, buffy coat) dispensed by the Integration Platform shall be accompanied by the following information:

1. The volume of the blood specimen (serum, plasma, buffy coat), in ul
2. Note whether hemolysis is present; see the attached figures:

Serum: hemolysis grade is classified as: None, Mild, Severe.

Plasma: hemolysis grade is classified as: None, Mild, Severe.

Buffy coat: hemolysis grade is classified as: None (layers visible), Present (layers not visible).

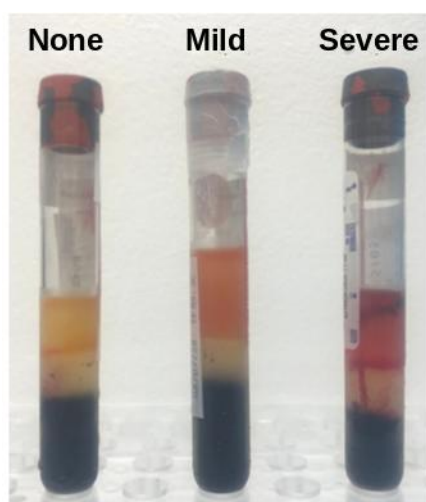


Figure 1: Serum Hemolysis Grade

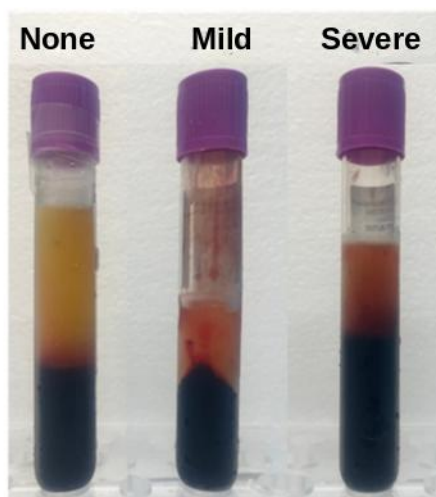


Figure 2: Plasma Hemolysis Grade

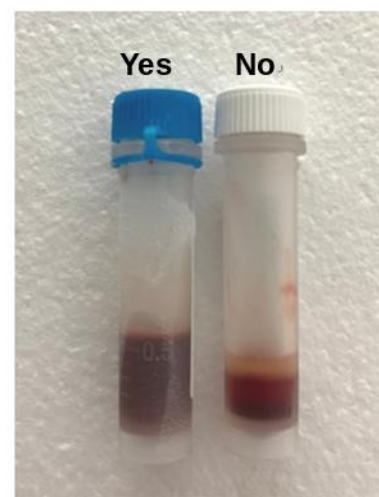


Figure 3: Buffy Coat Hemolysis Grade

Note: Generally speaking, hemolyzed serum or plasma is not suitable for dispensing; however, because some specimens are difficult to obtain, even if hemolysis is present, the specimen may still be dispensed if the applicant is able to accept it, provided this is noted and the applicant has been fully informed. Hemolysis of the buffy coat has relatively little effect on blood DNA extraction.