

 caHUB The Cancer Human Biobank OP-0002	<h2 style="text-align: center;">GTEx Chain of Custody Procedure</h2>
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1.0 PURPOSE

- 1.1 The purpose of this standard operating procedure (SOP) is to provide guidance on the processes used to continuously track the chain of custody (COC) for tissues collected at the subcontracted biospecimen source sites (BSS) for the Genotype-Tissue Expression (GTEx) project.
- 1.2 Specifically, this SOP will establish COC procedures and control what actions and materials are tracked for each sample within the project workflow.

2.0 SCOPE

- 2.1 The COC is defined as the documentation of the chronological movement of samples through receipt, possession, handling, and processing from the time of collection through analysis and final storage.
- 2.2 This GTEx Chain of Custody SOP encompasses all objectives required by the caHUB to adequately and accurately track the COC of biospecimen in this project.
- 2.3 Tracking COC is an essential part of any analytical process of a research project to ensure the identity and integrity of the sample from collection through data reporting.
- 2.4 Establishing an unbroken COC is essential in an effort to remove doubt regarding the identity and integrity of samples submitted to analysis and allows the project to defend the findings.
- 2.5 COC implements the process necessary for statistical process control and root cause analysis, a manufacturing discipline used to produce outputs (in this case, biospecimens) within required quality and tolerance limits.

3.0 RESPONSIBILITY

- 3.1 It is the responsibility of all project staff to ensure that a sample's COC history is documented per caHUB COC procedures.
- 3.2 BSS:
 - 3.2.1 It is the responsibility of each principal investigator to ensure that members of their project team appropriately document the collection, handling, storage (if any), and shipment of samples to ensure proper COC (see Attachment OP-0002-F1 GTEx Chain of Custody Form).
- 3.3 Receiving entities:
 - 3.3.1 It is the responsibility of each receiving entity to both document its role within the sample's COC and to adhere to their local SOP.

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3.3.2 At receiving entities performing processing and/or analysis, it is noted that additional COC information will be contained in laboratory notebooks (or other means), including the following: data received, initials of custodian, initials of analytic technician, parameters analyzed, results, disposal of samples, amounts remaining (if any), and training of staff on procedures.

4.0 DEFINITIONS

- 4.1 **BSS** – biospecimen source site. Site conducting procurement for the GTEX project.
- 4.2 **caHUB** – cancer Human Biobank. The caHUB is a project-driven initiative of the National Cancer Institute (NCI) designed to provide high-quality, well-annotated biospecimens and structured logistical operational procedures and processes to NCI and National Institutes of Health-sponsored projects.
- 4.3 **Case ID** – Donor (“case”) identification. The Case ID is an 11 character identification (e.g., GTEX-000000) which is obtained from the kits and assigned by the BSS at the time of donor procurement.
- 4.4 **COC** – chain of custody. The documentation of the chronological movement of samples through receipt, possession, handling, and processing from the time of collection through analysis and final storage.
- 4.5 **GTEX** – Genotype Tissue Expression. The GTEX project will determine how genetic variation controls gene expression and its relationship to disease. The NCI’s cancer caHUB will lead the GTEX biospecimen acquisition project comprised of three biospecimen source sites and a laboratory data analysis and coordinating center.
- 4.6 **Kit ID** – A human readable combination of alphanumeric symbols that identifies a kit or combination of tissue collection components. In the following example, GTEX 000002 0009, the 4 alpha characters (e.g., GTEX) identify the study/project, the subsequent six numerals (e.g., 000002) identify the donor (this string is the same as the Sample ID) and the final four numerals are randomly generated (dummy number).
- 4.7 **NCI** – National Cancer Institute
- 4.8 **Sample ID** – A human readable combination of alphanumeric symbols that identifies the sample or case. In the following example, GTEX-000002, the 4 alphas (e.g., GTEX) identify the study/project for which caHUB is collecting the specimens. The subsequent six numerals (e.g., 000002) identify the donor or case. This ID is associated with all of the specimens collected from one donor at a specific time/visit (donation).
- 4.9 **SOP** – standard operating procedure. A document written to establish the tools and processes needed for a given task to ensure consistency.



5.0 ENVIRONMENTAL HEALTH & SAFETY

Not applicable

6.0 MATERIALS/EQUIPMENT

- 6.1 The **GTEx Chain of Custody Form (OP-0002-F1)** will be utilized to ensure that the COC process is adequately documented.
- 6.2 Each BSS and receiving entity may also utilize an electronic COC system, per their local SOPs, as an additional documentation process.

7.0 PROCEDURE

7.1 Sample Handling:

- 7.1.1 The sample must be properly handled to ensure that there is no contamination during collection, and any deviation from the **GTEx Kit Receipt, Supplies, and Shipping Procedure (OP-0001)** should be documented by the BSS or other research entity.
- 7.1.2 It is imperative that the samples are handled as specified in the project SOPs, including this SOP as well as the **GTEx Tissue Procurement SOP (PR-0004)** and the **GTEx Kit Receipt, Supplies, and Shipping Procedure (OP-0001)**.

7.2 Sample Labeling:

- 7.2.1 The labeling or proper marking of samples and monitoring devices will help to ensure positive identification throughout the sampling and analysis process.
- 7.2.2 All labeling should be conducted per the **GTEx Kit Receipt, Supplies, and Shipping Procedure (OP-0001)**.
 - 7.2.2.1 If ink is being used for the marking, then it must be indelible and unaffected by the products and temperatures to which it will be subjected.
 - 7.2.2.2 Other methods such as barcode identification can be used as long as it does not impair the capacity of the filter to function.
- 7.2.3 All kit containers must have a unique identification (kit ID#) to exclude the possibility of interchange. The kit ID # is located on the outside of the kit box.
- 7.2.4 The marking should be indelible and permanently affixed to each strip chart.

7.3 Sample Collection:

- 7.3.1 The sample must be collected under the condition reported per the **GTEx Tissue Procurement SOP (PR-0004)**.



7.3.2 After collection, the sample must be placed in the container per the ***GTEx Tissue Procurement SOP (PR-0004)***. If necessary, adhesive or tape should be used to ensure the container is adequately sealed to protect the sample from accidentally being exposed during shipment.

7.4 Sample Transportation:

7.4.1 All transported samples must be accompanied by a shipping manifest and a ***GTEx Chain of Custody Form (OP-0002-F1)***.

7.4.1.1 Shipping Manifest: The Bio4D system should be utilized to print the shipping manifest from the system and subsequently uploaded into the system. This will mark the status of the shipment as "in process".

7.4.1.2 The ***GTEx Chain of Custody Form (OP-0002-F1)*** includes the following: Case ID, originating kit ID, origination of sample, collection date, operator signature, sampling conditions.

7.4.2 One ***GTEx Chain of Custody Form (OP-0002-F1)*** can travel with a batch or list of samples, provided all samples have gone through the identical COC. If a batch is divided, the form can be duplicated and sent with each new batch to different locations.

7.4.3 It is important to minimize the number of staff/entities handling the samples.

7.4.4 All samples must be hand carried or sent by a reputable courier service as outlined in the ***GTEx Kit Receipt, Supplies, and Shipping Procedure (OP-0001)***.

7.4.4.1 At the time of transfer to a courier, all kits or shipping materials must be sealed.

7.4.5 During transportation, there is a potential for tampering, accidental destruction, and/or physical or chemical action to occur within the sample container or kit. Once the samples have been delivered to the receiving entity, the addressee must complete the following steps:

7.4.5.1 The package should be checked for tampering.

7.4.5.2 The package should be opened to verify its contents.

7.4.5.3 The accompanying ***GTEx Chain of Custody Form (OP-0002-F1)*** should be signed.

7.4.5.4 The samples should be logged as 'received' while the receiving entity is going through the receipt process; i.e., verifying and documenting multiple parameters in the same package container.



7.5 Sample Custody:

7.5.1 A sample should only be in the possession of identified project personnel or an identified project courier.

7.5.1.1 A sample is considered under a staff member's custody if any of the following apply:

7.5.1.1.1 The sample is in the physical possession of the staff.

7.5.1.1.2 The sample is in a staff's view after written or physical possession has been taken.

7.5.1.1.3 The sample has been secured or stored to ensure no one can tamper with the sample.

7.5.1.1.4 The sample has been secured in an area to which access is restricted to authorized personnel only.

7.6 GTEx Chain of Custody Form Completion

7.6.1 The **GTEx Chain of Custody Form (OP-0002-F1)** should be completed, for all entities interacting with the samples, per the **GTEx Chain of Custody Form Guidance (OP-0002-F2)**.

7.7 Continuous Monitoring:

7.7.1 A combination of paper and electronic systems may be utilized to track the sample.

7.7.2 Each sending or receiving entity is responsible for maintaining its own COC procedures for referencing and auditing purposes.

7.7.3 7.7.3: Each step of the completed COC should be forwarded to caHUB via e-mail.

7.8 Sample Receipt and Documentation:

7.8.1 Any staff member who takes custody (see section 7.5) must complete the **GTEx Chain of Custody Form (OP-0002-F1)**.

7.8.2 Any entity which transfers possession to another entity must (a) make a copy of the **GTEx Chain of Custody Form (OP-0002-F1)** for their records and (b) ensure a copy is traveling with each sample/sample batch to its destination.

7.8.3 The COC form should be forwarded to the receiving entity point staff and the GTEx email.

7.8.4 Any staff mailing a sample to another location should take necessary precautions to avoid tampering during transportation.

7.8.5 Any staff who takes custody of the samples and associated data must document whether any tampering, accidental destruction, and/or physical or chemical action is observed.

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7.9 Resolving Discrepancies:

- 7.9.1 If a discrepancy is recorded, for example the number of samples shipped does not match the number received, the shipping party and receiving party will notify the project manager and will work to resolve the discrepancy and document the resolution to be shared with the caHUB.
- 7.9.2 Any discrepancy resolution request should be responded to within 24 hours of receipt. Specimen will remain in quarantine until issues are resolved pertaining to biospecimen identification or labeling.

7.10 Storage of COC Forms:

- 7.10.1 The **GTEx Chain of Custody Form (OP-0002-F1)** should be stored at the BSS for a minimum of 10 years of specimen travel/receipt as per the caHUB's document retention policy which is 10 years from close of project.
- 7.10.2 caHUB will collate all completed COC forms and keep an audit log of where all the kit content chronological history and current residence.

8.0 REFERENCES

- 8.1 GTEx Tissue Procurement SOP (PR-0004)
- 8.2 GTEx Kit Receipt, Supplies, and Shipping Procedure (OP-0001)

9.0 ATTACHMENT

- 9.1 GTEx Chain of Custody Form (OP-0002-F1)



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APPROVALS		
NAME / TITLE	SIGNATURE	DATE

INITIATION/REVISION HISTORY			
REV #	DESCRIPTION OF CHANGE	AUTHOR	EFFECTIVE DATE