**MEMORANDUM OF UNDERSTANDING FOR**

**FORCE PANEL SNP ANALYSIS OF DNA SAMPLES**

# BETWEEN

**[Laboratory 1 / National Board of Forensic Medicine, Linköping, Sweden]**

**AND**

**[Laboratory 2]**

1. **PURPOSE OF THIS DOCUMENT**

This Memorandum of Understanding (MOU) establishes the framework for collaborative work between **Laboratory 1** and **Laboratory 2** to evaluate the FORensic Capture Enrichment (FORCE) panel for SNP analysis of DNA samples. The purpose of this MOU is to provide information on this specific cooperative activity between **Laboratory 1** and **Laboratory 2** and to facilitate the exchange of samples and analytical data related to this work.

1. **BACKGROUND**

**Laboratory 1** has developed the FORCE panel for SNP analysis of DNA samples. The FORCE panel includes 5,424 SNPs and encompasses the following SNP marker types: extended kinship, identity, ancestry, phenotype, X-chromosome, and Y-chromosome. In a preliminary study (Tillmar et al., 2021), the FORCE panel was assessed using hybridization capture and massively parallel sequencing (MPS) technology. The results indicated that the FORCE panel was robust and suitable for both high quality and degraded DNA samples.

The aim of the present inter-laboratory study is to assess the performance of the FORCE panel using a standard sample set to be assayed using multiple methodological approaches. The sample set will include control DNAs and mock casework DNA samples (see Table 1). The sample set will be provided by **Laboratory 1** to **Laboratory 2** and other participating laboratories. The methodological approaches that will be evaluated by participating laboratories include, but are not limited to: PCR amplification, hybridization capture, sequencing by synthesis, semi-conductor sequencing, and pyrosequencing MPS techniques. **Laboratory 2** will perform FORCE panel enrichment and sequencing of the DNA samples, using an agreed upon methodological approach (QIAseq methodology, AmpliSeq methodology, myBaits methodology etc), and provide the associated MPS data to **Laboratory 1** for data analysis. **Laboratory 2** will not be required to perform data analysis.

**Laboratory 1** and **Laboratory 2** wish to enter into an agreement so that **Laboratory 2** can participate in the inter-laboratory FORCE panel study.

Table 1 – samples to be included in the study

|  |  |  |  |
| --- | --- | --- | --- |
| Sample number | Sample type | Description | Sample status for Laboratory 2 |
| 12 samples | Reference DNA samples /Control DNA | Coriell samples, 2800M, NIST (SRM and non-SRM) samples | DNA will be provided, with known DNA concentrations, in single tubes. The samples will be anonymized with tubes labeled “Sample A”, “Sample B”… |

1. **MATERIAL TRANSFER AGREEMENT**

The material exchanged as part of this agreement will be physical samples in the form of gross sample or extracted DNA. The sample set will include control DNAs and mock casework DNA samples. 12 samples will be transferred from **Laboratory 1** to **Laboratory 2**. **Laboratory** **1** will obtain any research approvals necessary for transferring the samples to **Laboratory** **2** and the agreed upon **Laboratory** **2** FORCE panel testing. However, **Laboratory** **2** is responsible for obtaining any necessary Human Subjects research approvals or exemptions required to use the samples and data at **Laboratory** **2**. **Laboratory 1** agrees not to provide **Laboratory 2** with any identifiable private information of any living individual or any code to identify any identifiable private information. Samples will be fully anonymized. **Laboratory 2** agrees to use the samples and resulting data for the approved project only, and will neither use the samples for any unapproved purposes nor transfer the samples to a third party.

**IV. DATA TRANSFER AGREEMENT**

Test results and/or other analytical data resulting from **Laboratory** **2**’s testing of the DNA samples will be transferred to **Laboratory 1**. Data to be transferred include any quantification or quality control Data, the original FASTQ files, and, if such exist, any resulting BAMs, sequence output reports, and sample genotypes. These Data and associated files will be transferred through an approved secure transfer service or a secure tape/hard drive provided by **Laboratory 1**.

**Laboratory 2** will not attempt to decipher any identifiable private information from the Data or to identify the individual who is the subject of the Data.

**Laboratory 1** reserves the right to transfer the Data to a third party **(Laboratory 3)** for analytical support, provided the third party adheres to and does not override the conditions of the MOU agreed upon herein.

**V. RELEASE OF INFORMATION**

In the event that the analyses pursuant to this MOU provide results of interest to the scientific community, the parties named in this document agree to publication of the results in the appropriate scientific vehicle and in accordance with academic practice. In no case, however, will public release of shared material be made by either party without coordination and mutual agreement.

1. **RIGHT OF OWNERSHIP**

Background Knowledge is proprietary of Laboratory 1. The Parties grant to each other a royalty-free, non-exclusive license for the duration of the Research Project to use the Background Knowledge. The license is limited to use for research necessary for the completion of the Research Project.

The right of ownership to Foreground Knowledge shall belong to the Party whose employees intellectually have generated the relevant Foreground Knowledge.

The right of ownership to Joint Foreground Knowledge shall belong to the contributing Parties jointly.

It is defined as Background Knowledge all information – including any result, regardless of form and regardless of whether it is or can be protected, and intellectual property rights derived thereof – which does not constitute Foreground Knowledge. All information, including any result, is considered Background Knowledge unless it is evident from the circumstances that it is Foreground Knowledge.

It is defined as Foreground Knowledge all information – including any result, regardless of form and regardless of whether it is or can be protected and intellectual property rights derived thereof - (i) which originates from the Research Project, and (ii) which is generated by a person employed with and allocated by a Party to the Research Project.

It is defined as Joint Foreground Knowledge any foreground knowledge to which both Parties have contributed intellectually.

1. **TERMINATION**

Either party may request changes to this MOU. Any changes, modifications, revisions or amendments to this MOU which are mutually agreed upon by the parties shall be incorporated in writing, and be effective when executed and signed by both parties. This agreement may be terminated at any time by either party upon written notification. The Agreement becomes effective on the last day of signature.

1. **OPERATION**

A principal point of contact within each organization shall coordinate communications resulting from this MOU. Communications may be in writing, in person, or by phone.

1. **FINANCING**

Laboratory 1 and Laboratory 2 shall defray own costs in relation to the Project. If the parties apply for and obtain external funding, additional agreements may be entered between the involved parties.

1. **LIABILITY**

A Party shall be liable for gross negligence or intentional neglect of its obligations and for the wrongful acts and omissions of their employees and students under this Agreement. However, such liability shall not apply to consequential losses other indirect losses.

None of the Parties shall be liable for a failure to fulfil their obligations under the Agreement if the failure to perform is due to force majeure, an unforeseen intervening event, outside the control of the Parties.

**Laboratory 1 Principal Point of Contact**:

[Andreas Tillmar (andreas.tillmar@rmv.se), Department of Forensic Genetics and Forensic Toxicology, National Board of Forensic Medicine, Artillerigatan 12, SE58758 Linköping, Sweden; +46104834143]

**Laboratory 2 Principal Point of Contact**:

[Name and address]

For **Laboratory 1**:

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Signature DATE

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Name and position of institutional official

For the **Laboratory 2**:

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Signature DATE

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Name and position of institutional official