

Accessing Human Samples For Research

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5 Jan 2023

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Introduction to SingHealth Tissue Repository (STR)

Introduction to STR

- ❑ Core platform to serve the needs of SingHealth researchers

- ❑ International biobanking standards:
 - ❑ Follows biobanking standards of International Society for Biological and Environmental Repositories (ISBER)
 - ❑ Certified biobank under Canadian Tissue Repository Network (CTRNet)
 - ❑ Subscribes to ISBER and College of American Pathologists (CAP) proficiency programs

Types of Collection

Types of Collection

1. “Scheduled Collection” – collection for specific research project

Human Biomedical Research (HBR) with Institutional Review Board (IRB) approved protocol

- Provides biobanking services for ongoing IRB approved research studies
- Samples are collected, processed, and stored according to PI’s defined research protocol
 - Charges apply

Types of Collection

2. “Unscheduled Collection” – Collection for future research

Biobanking protocol (with approval from SingHealth Biobank Research Scientific Advisory Executive Committee)

- ❑ Collects tissue opportunistically from consented patients listed for surgery at SingHealth hospitals
- ❑ Samples banked following STR’s standard protocol
- ❑ The entire store of banked tissue specimens (approximately 22,000 cases) is available to all SingHealth researchers
 - Tissue withdrawal charges apply

Overview of STR Unscheduled Collection

Overview of STR Unscheduled Collection

1. Consent Taking



2. Tissue/Blood Collection, Processing, Storage and Data Entry



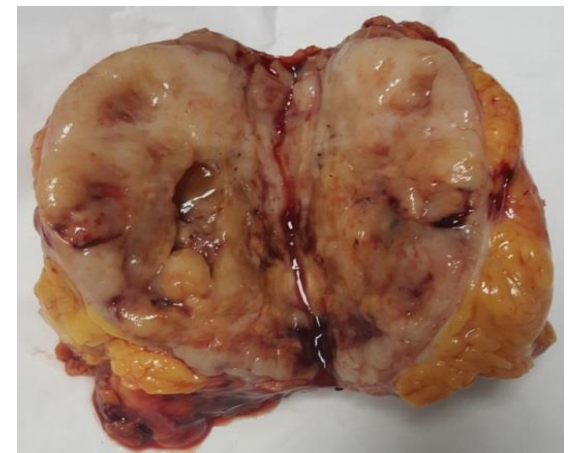
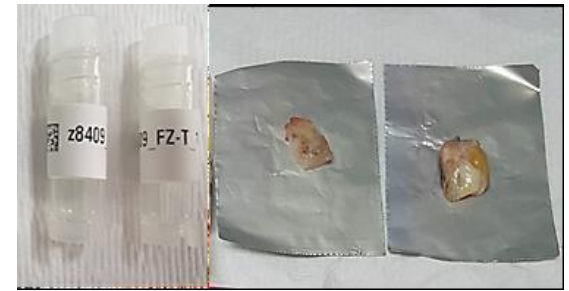
3. Quality Assessment & Data Collection

1. Consent Taking

- Broad informed consent is obtained pre-operatively from the patient
- We encourage clinical groups (e.g. breast surgery, urology, gynaecological oncology, hepatobiliary surgery etc.) to set up a consent-taking workflow to increase opportunistic tissue banking rates as an investment for future specialty-focused research needs

2. Tissue/Blood Collection, Processing, Storage and Data Entry

- Collect leftover tissue samples (tumor and matched normal tissue)
- Stored frozen
- Quality checks
- Collect whole blood-> stored as buffy coat, plasma, serum, whole blood
- All samples are de-identified



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2. Tissue/Blood Collection, Processing, Storage and Data Entry



- ❑ Frozen samples are stored in vapour phase liquid nitrogen tank -196°C for long term storage



**SingHealth Tissue
Repository**

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2. Tissue/Blood Collection, Processing, Storage and Data Entry

- Collect residual formalin-fixed tumour and matched normal tissue after completion of histological diagnosis
- Archived as paraffin blocks
- Resource for TMA construction, provision of tissue sections for research / control use

2. Tissue/Blood Collection, Processing, Storage and Data Entry

OpenSpecimen

Secured information system tracking samples and data

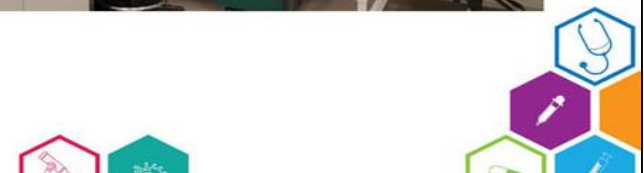
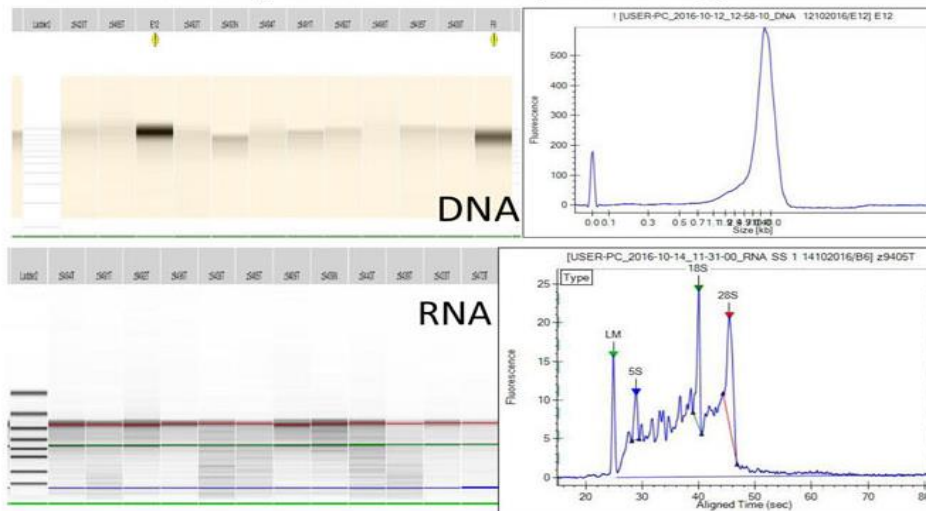
- Patient information
- Collection details (surgeon, harvester, date of collection, time points e.g. specimen out / received / frozen)
- Sample information
 - ❖ Specimen type (e.g. tissue, blood, urine)
 - ❖ Anatomic site (e.g. liver, breast, colon)
 - ❖ Pathological status (e.g. benign, malignant)
 - ❖ Storage location
- Relevant clinical information (e.g. infection, treatment, history)

3. Quality Assessment & Data Collection

Perform nucleic acid quality and quantity check

Nucleic acid quality

- Extraction of DNA and RNA from frozen material
- Quantity and Quality testing



3. Quality Assessment & Data Collection

Histological assessment (neoplastic cellularity % and histological features)

Quality Control on Tumour Content in Tissue Samples

- Processing of Tissue samples
- Histological examination to determine tumour content and grade

The screenshot displays a digital pathology interface. On the left, there are four histological images: three low-magnification views of tissue sections and one high-magnification view of glandular structures. The central panel shows a data entry form for a tissue sample identified as 'z9145-FX-T_2-PA-FXS'. The form includes fields for 'Ki-67' with radio buttons for 'Positive' (selected) and 'Negative', a 'Positive Percentage' field set to '50', and 'Positive Score' radio buttons for 'Score 1', 'Score 2' (selected), and 'Score 3'. Below these are 'Save', 'Delete', and 'Cancel' buttons. On the right, a 'Tissue Review Event' form lists various parameters: 'Neo Plastic Cellularity Percentage' (50), 'Necrosis Percentage' (10), 'Lymphocytic Percentage' (5), 'Stroma Percentage', 'Monocyte Percentage', 'Neutrophil Percentage', 'Total Cellularity Percentage (Normal Tissue Percentage)', 'Fat Percentage' (20), 'Histological Quality' (Excellent- Definable Nuclear Detail), and 'User'.

3. Quality Assessment & Data Collection

Collect clinical data from SCM and input into OpenSpecimen

- diagnosis
- histopathological report
- FISH results

How to access samples from STR for research?

Unscheduled Collection Inventory (as of December 2022)

Total number of cases: 22398
Total number of aliquots: 146353

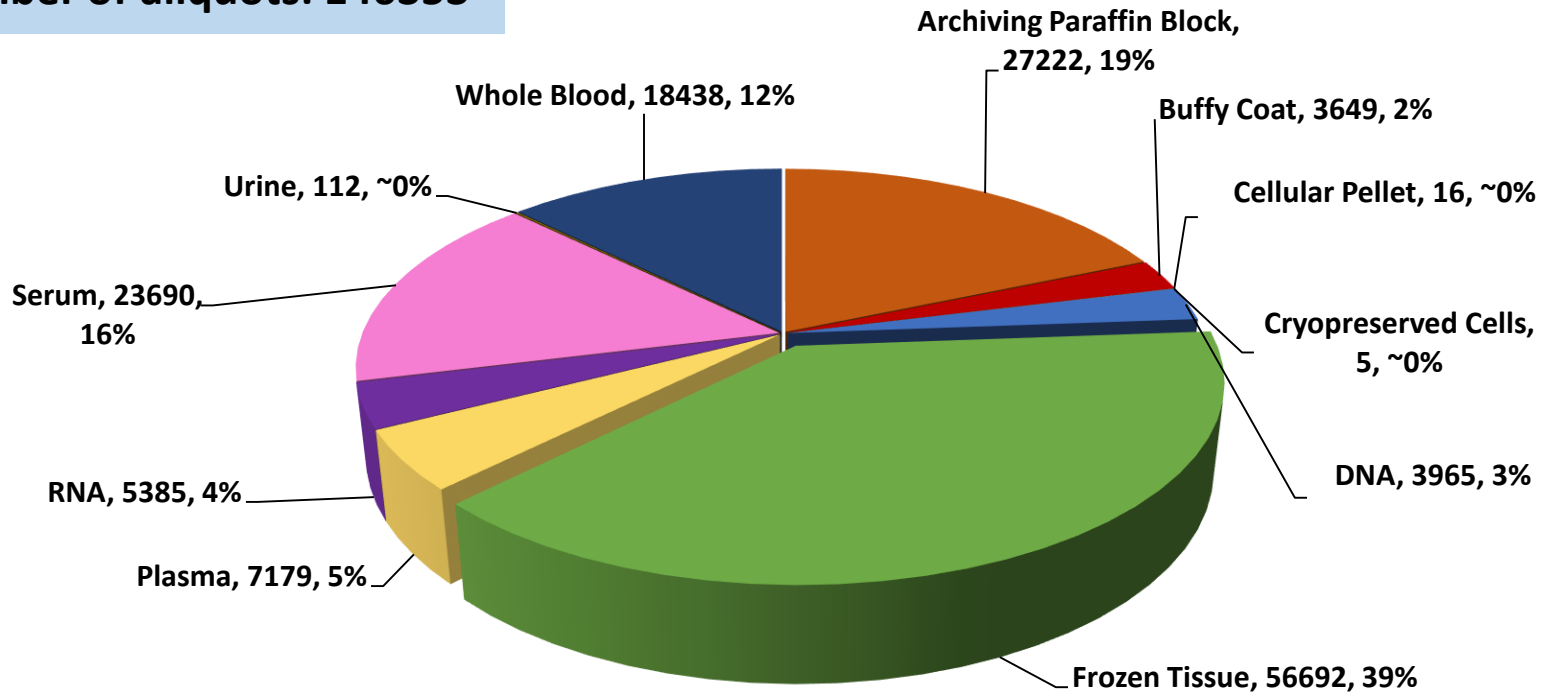


Figure 1. Unscheduled collection inventory as of December 2022 by specimen type

Unscheduled Collection Inventory (as of December 2022)

Total number of cases : 22398
Total number of aliquots : 146353

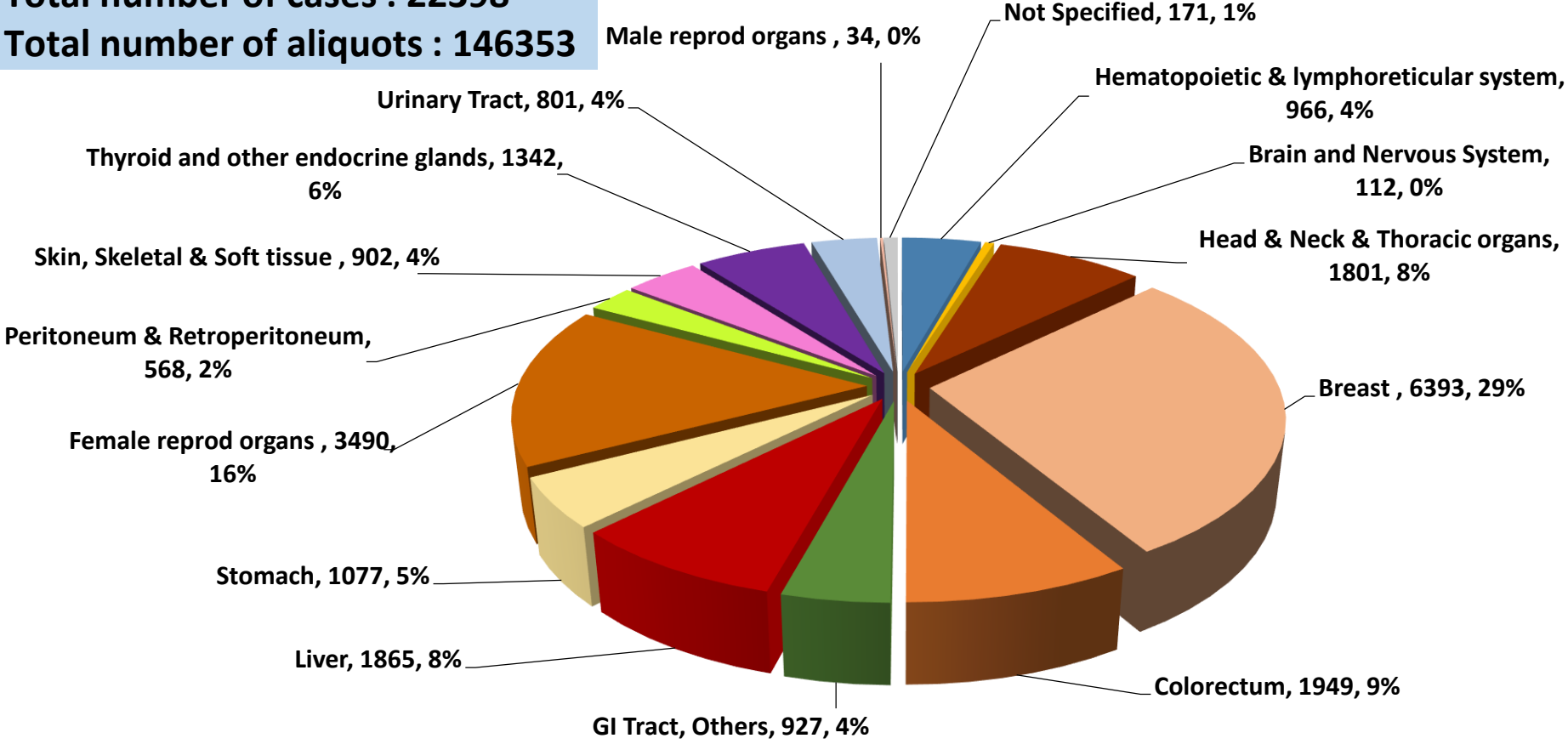
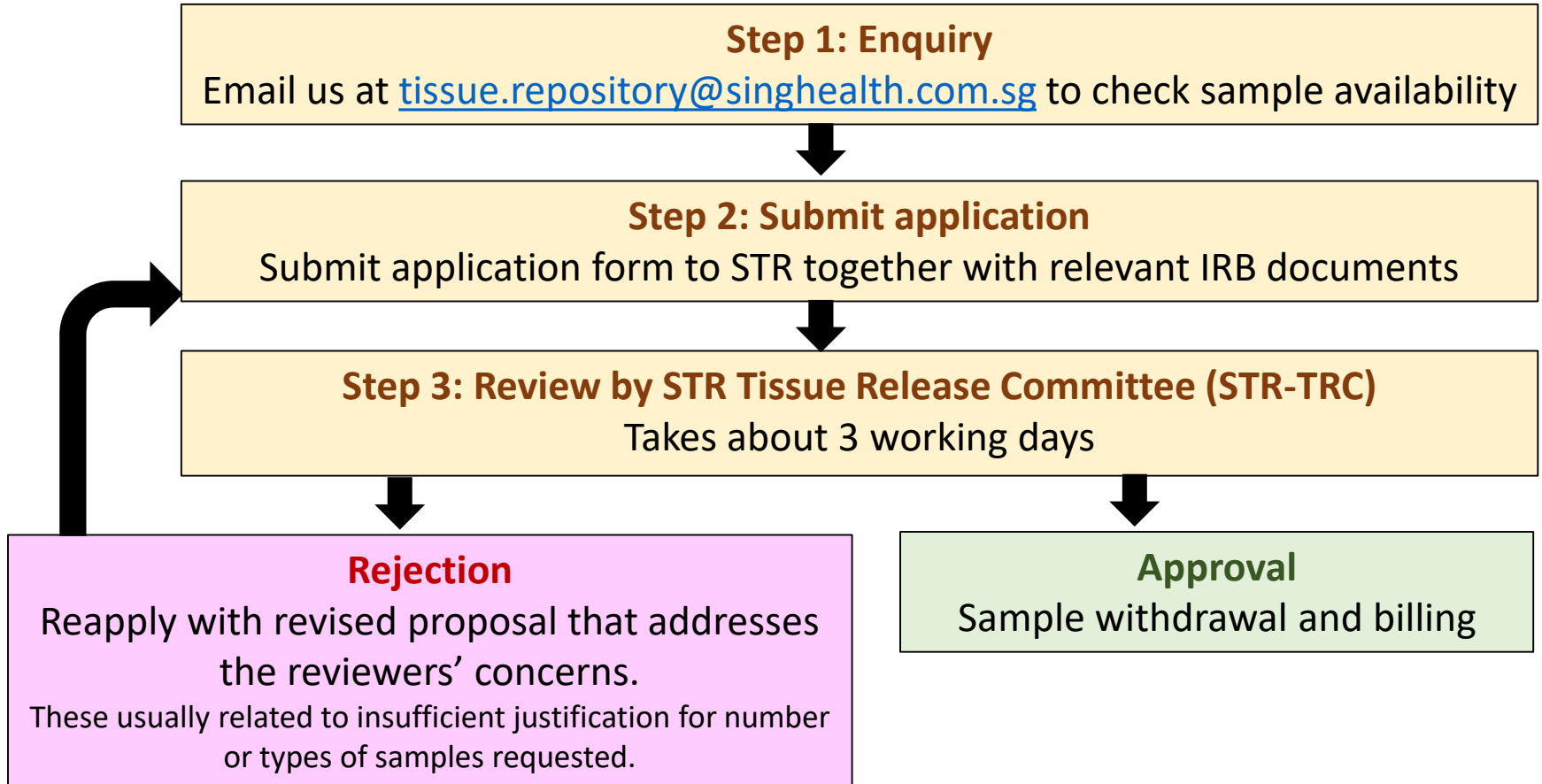


Figure 2. Unscheduled collection inventory as of December 2022 by tissue site

How to access samples from STR for research?

- ❑ PI submits an application request to STR together with relevant IRB documents.
- ❑ Contributing clinicians/ departmental representatives/PI will be given every opportunity to collaborate in the research project so as to merit co-authorship in any scientific publications arising from the research project.

Application process



Trusted Third Party Services

Trusted Third Party (TTP) Services

- Appointed TTP of SingHealth HQ
- De-identification of samples and associated data
- Charges apply

Advanced Molecular Pathology Laboratory (AMPL) Services

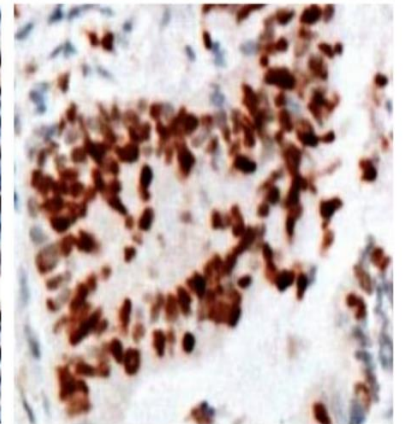
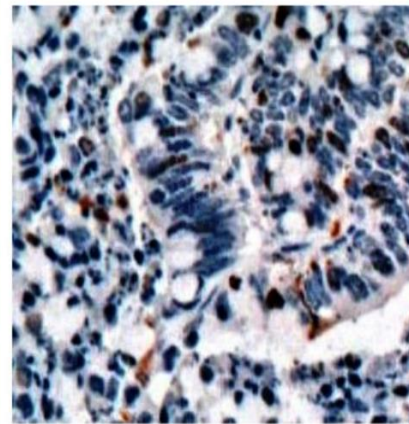
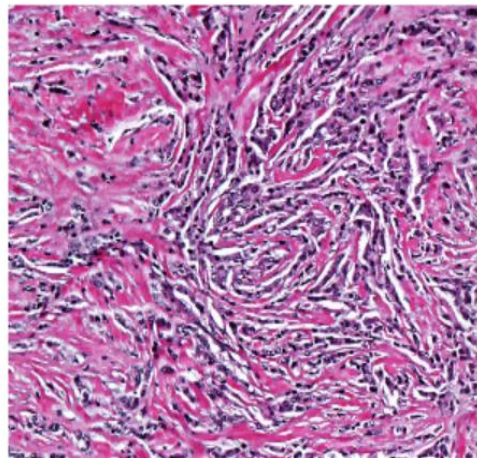
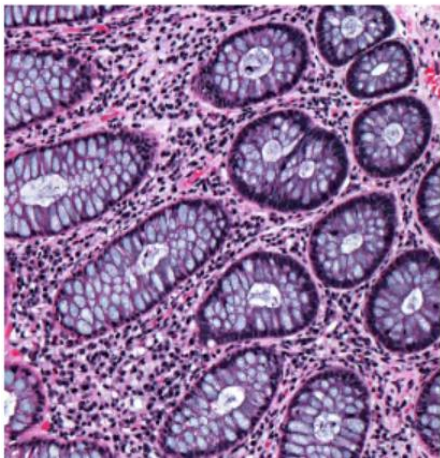
Advanced Molecular Pathology Laboratory (AMPL) Services

- ❑ A one-stop service for researchers and industry partners providing tissue-based pathology services:
 - Histotechnical support for tissue-based research
 - Non-identifiable formalin fixed paraffin embedded tissue sections of different tissue types as control tissue

Advanced Molecular Pathology Laboratory (AMPL) Services

☐ Services provided include:

- I. Histological services, such as tissue processing, microtomy, cryosectioning
- II. Evaluation of new immunohistochemical antibodies for research
- III. Staining and interpretation of histochemical and immunohistochemical (IHC) stains and in situ hybridisation (ISH) assays including fluorescence ISH



Advanced Molecular Pathology Laboratory (AMPL) Services

IV. Tissue microarray (TMA) construction or provision of unstained TMA sections from our existing extensive collection of 620 TMA blocks representing a broad range of tissue and cancer types

Total number of TMA blocks: 620

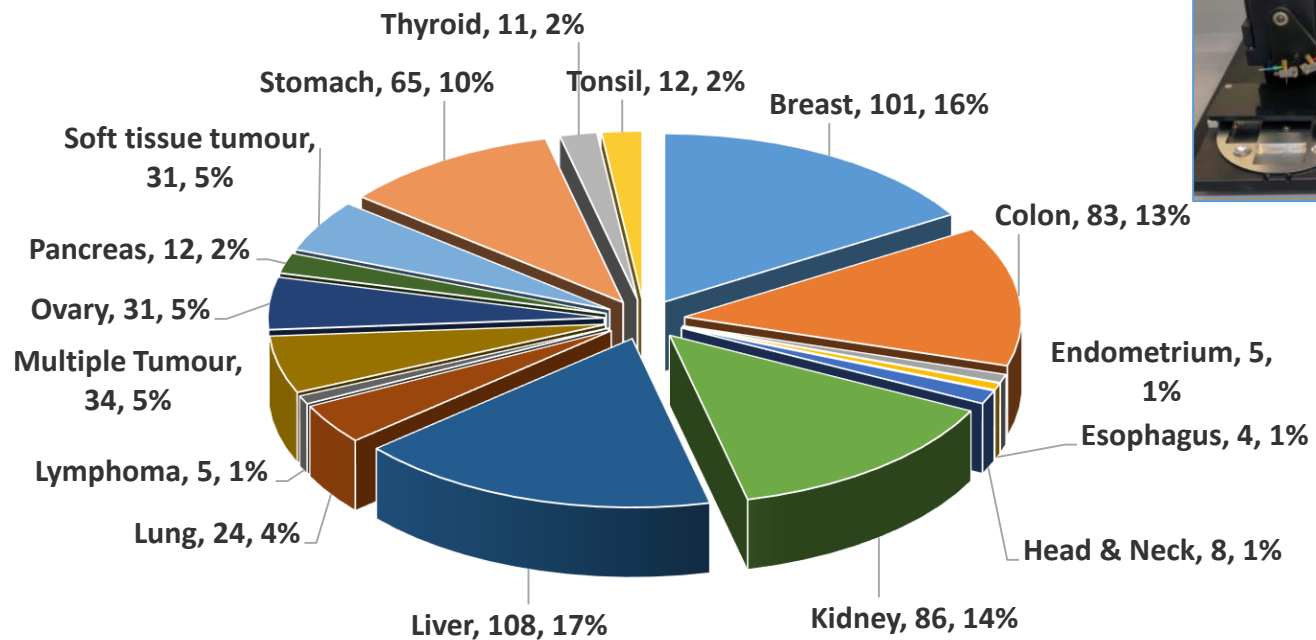
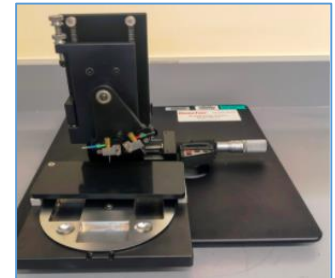
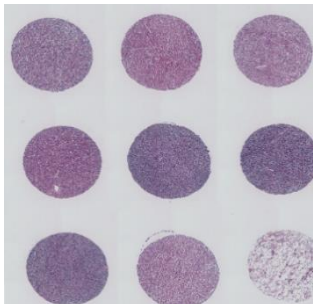
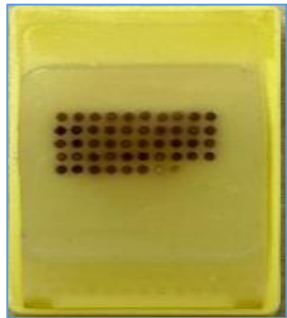


Figure 3 TMA by specimen type

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Thank You

For enquiries on STR's samples or services, please email tissue.repository@singhealth.com.sg or call us at 65767117 / 65767119.

For enquiries on AMPL services, please email ampl@singhealth.com.sg

For more information, please visit our website
<https://www.singhealthdukenus.com.sg/research/str-ampl>

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