RNAlater pathway for solid cancer whole genome sequencing (WGS)

The North Thames Genomic Medicine Service (NT-GMS) is now accepting solid tumour cancer samples transported in RNAlater solution from patient who are eligible for whole genome sequencing (WGS). This removes the need for immediate freezing or dry ice shipment in many cases and makes out-of-hours sampling safer and more practical.

- Invitrogen RNAlater Stabilization Solution is an aqueous, nontoxic tissue RNA stabilization and storage reagent that rapidly permeates tissues to stabilize and protect cellular RNA
- RNAlater is to be purchased by the referring organisation and is available in various quantities (100-500ml) or in aliquots of 1.5ml and 5ml (RNA Stabilization and Storage - RNAlater | Thermo Fisher Scientific - UK)
- For further information see RNAlater® Tissue Collection: RNA Stabilization Solution Protocol (PN 7020M Rev E)
- RNAlater is stored at room temperature (RT)

Steps for Processing Samples in RNALater

- Use RNAlater solution with fresh tissue only. *Do not freeze tissues* before immersion in RNAlater solution
- Place the fresh sample immediately into a labelled containing RNALater at RT
- A ratio of 5 volumes of RNAlater to tissue volume is recommended. Tissues should not exceed 5mm in thickness.
    - For example, 15ml falcon tube or bijoux filled with 5 volumes of RNAlater solution to preserve the tissue (e.g 0.5g sample requires 2.5ml of RNAlater).
    - For standard 14G biopsies, 1ml of RNAlater in an Eppendorf is suitable.
- Samples are stable at RT for at least 5 days and can be transported to NT-GMS Laboratory at Great Ormond Street (address below) using standard transport.
- If long-term storage is required, samples in RNAlater can be transferred to 4^{o}C refrigerator and reported to be stable for at least 4 weeks or transferred to -20^{o}C to -80^{o}C for longer periods.
- When sending samples for cancer WGS please state clearly on the Test Order Form Cancer WGS (PDF) that the tumour sample has been transported in RNAlater

Assessment of Histology and Tumour Cellularity

Histological and tumour-purity assessment must be performed by the referring organisation before samples are submitted for WGS. Different approaches have been applied in different laboratories based on expertise and local resources. These include:

- Taking of 'mirror sample' for formalin fixation at time of sample selection, to be processed, paraffin wax embedded, and H&E section generated (most suitable for excision samples)
- Division of sample removed from RNALater with one part then being processed, paraffin wax embedded and H&E section generated. The remainder of the sample is extracted for DNA
- Generation of section from RNALater sample, embedding the sample in OCT or Agar as a 'support' to facilitate section cutting
- Touch imprint cytology assessment from the fresh sample prior to placing in RNALater. Briefly, the fresh core is rolled over a slide, which is then air-dried and stained with a modified Giemsa. Thus, there is no need for a H&E to be generated.

Send samples to this address:
SIHMDS, North Thames GLH
Specimen Reception
Level 5, Barclay House
Great Ormond Street Hospital
37 Queen Square
London WC1N 3BH

For further information: gos-tr.pmu@nhs.net