

XRH Preliminary Report: FMPA06681-FIXED

Evaluation and development of foetal post-mortem imaging by means of X-ray microfocus Computed Tomography (μ CT) – Phase 1

Sample Overview

Assigned Sample ID: FMPA06681-FIXED

Original ID: 14

Species: Human

Tissue: Embryo

Current Status / Location: XRH Room

N.B. If you have access to this location please don't move it without letting a member of XRH team know.

Description:

120g, twisted umbilical cord herniation gut

Scans

20221010_XRH_3101_OLK_FMPA06681-FIXED_14

Scan properties

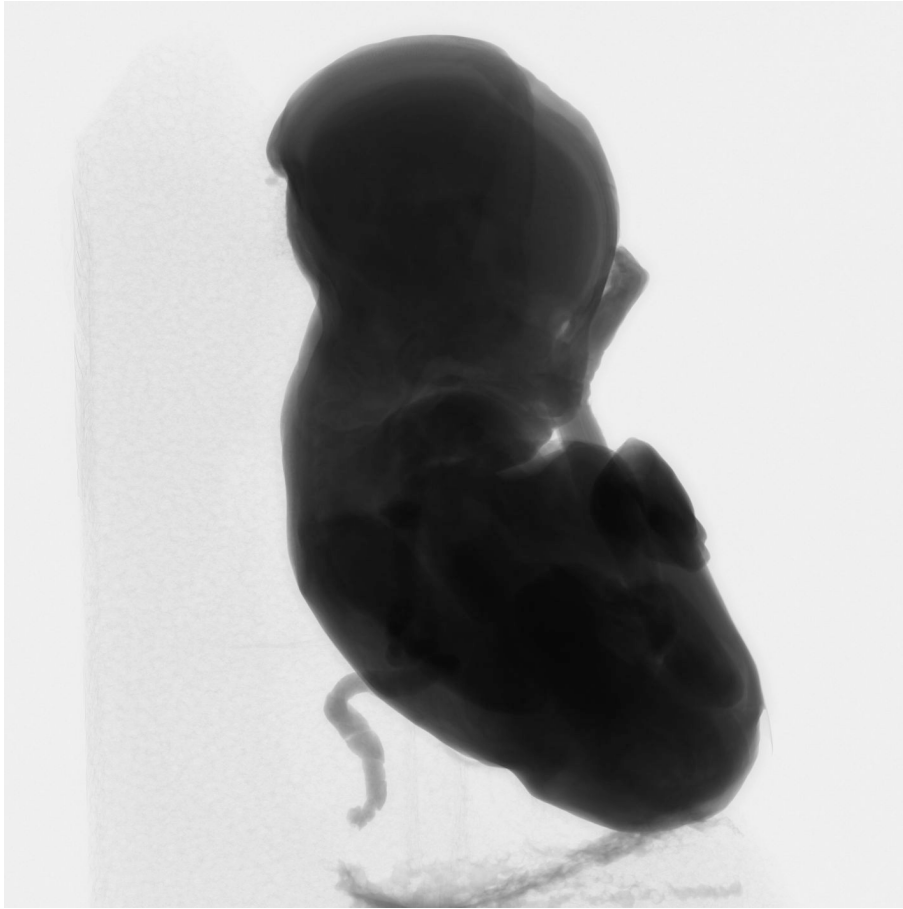
Parameter	Value
Type	CT Scan
Voxels X	1873
Voxels Y	1864
Voxels Z	2850
Voxel size X	40.64 μm
Voxel size Y	40.64 μm
Voxel size Z	40.64 μm

These dimensions are for the raw reconstructed volume only, other files may have been processed to have different dimensions.

Images

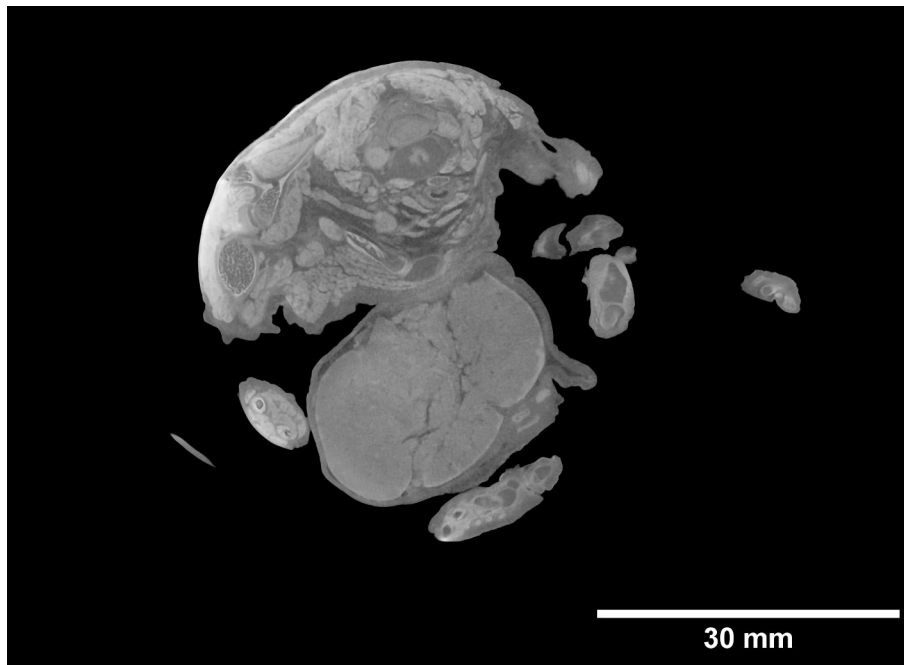


Raw radiograph of the sample rotated to 0 degrees



Raw radiograph of the sample rotated to 90 degrees

Videos



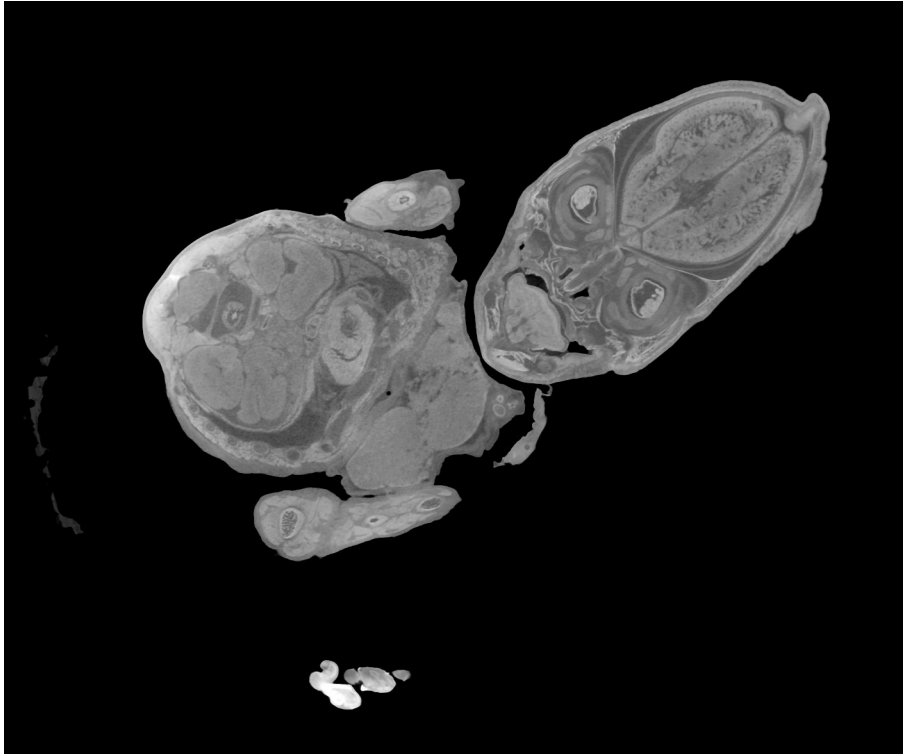
A video going through the Z stack in single slices.

Available online: https://drive.google.com/file/d/1_UPjF7HlFeVtk2hQn40G65Bw--hN_uf/view

SourceVolumeFilename= 13330_20221010_XRH_3101_OLK_FMPA06681-
FIXED_14_2216x2568x2664x16bit.raw
SliceThickness= 1

ShortTitle= XY single slice roll - 20221012-15h10m

Description= "This is a cross-sectional view of the XRH image stack along the XY plane. XRH datasets are normally oriented (resliced) in a way that a scroll through the stack along the XY plane emulates the physical histology slicing of the tissue."



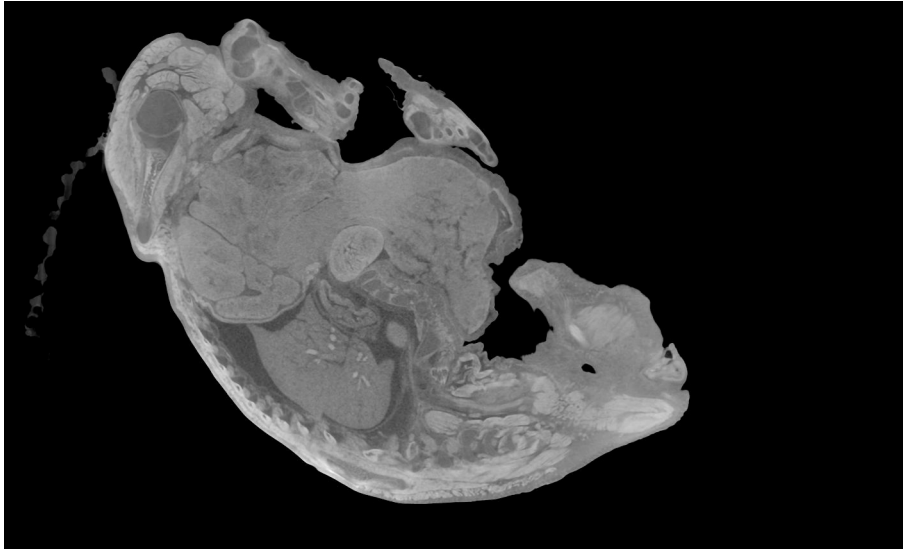
A video going through the Y stack in single slices.

Available online: https://drive.google.com/file/d/1slXZ6j3KQw0Lrt_4OkHgZKLHzvfEcJf8/view

SourceVolumeFilename= 13330_20221010_XRH_3101_OLK_FMPA06681-
FIXED_14_2216x2568x2664x16bit.raw
SliceThickness= 1

ShortTitle= XZ single slice roll - 20221012-15h10m

Description= "This is a cross-sectional view of the XRH image stack along the XZ plane. XRH datasets are normally oriented (resliced) in a way that a scroll through the stack along the XY plane emulates the physical histology slicing of the tissue. XZ plane is normal to XY and YZ plane."



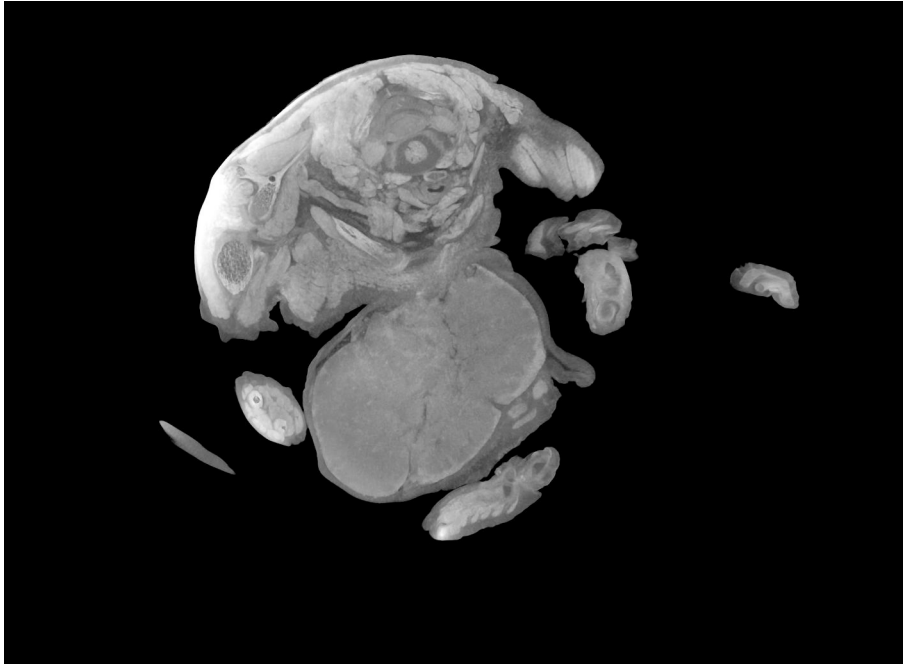
A video going through the X stack in single slices.

Available online: <https://drive.google.com/file/d/1MBq8U392MWIU84ZYtSAmfHSYoQgIKfOA/view>

SourceVolumeFilename= 13330_20221010_XRH_3101_OLK_FMPA06681-
FIXED_14_2216x2568x2664x16bit.raw
SliceThickness= 1

ShortTitle= YZ single slice roll - 20221012-15h10m

Description= "This is a cross-sectional view of the XRH image stack along the YZ plane. XRH datasets are normally oriented (resliced) in a way that a scroll through the stack along the XY plane emulates the physical histology slicing of the tissue. YZ plane is normal to XY and XZ plane."



A Maximum Intensity Projection (MIP) of the sample through the Histologically relevant plane.

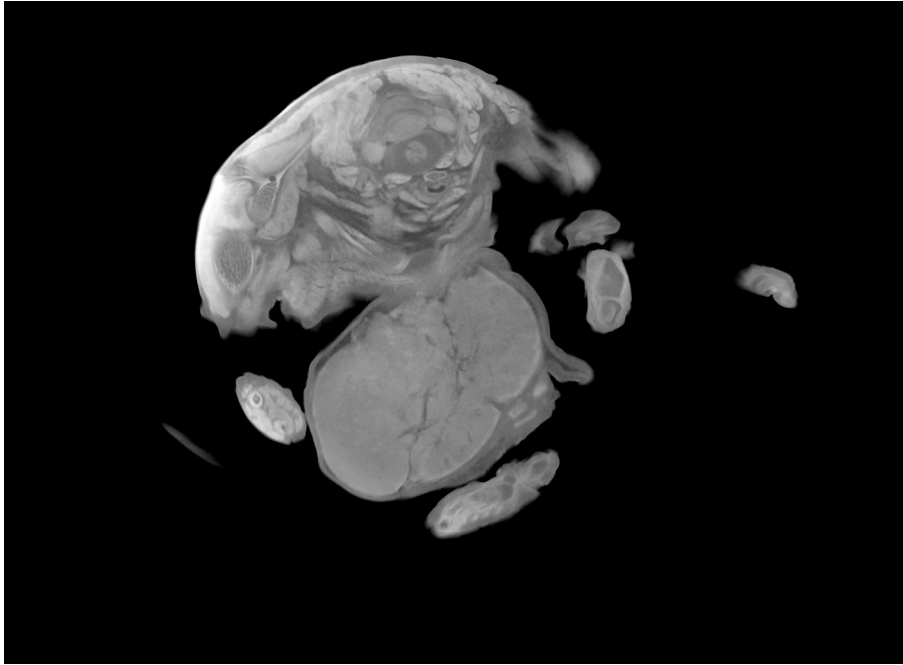
Available online: https://drive.google.com/file/d/1tvM_k9f5QLog8oEtgh-O18hXnKctZG7/view

SourceVolumeFilename= 13330_20221010_XRH_3101_OLK_FMPA06681-
FIXED_14_2216x2568x2664x16bit.raw
SliceThickness= 20

ShortTitle= Maximum intensity projection thick slice roll - 20221012-15h10m

Description= "This is a 2D visualisation rendering the Maximum Intensity of 20x single XY slices along the z-axis of the stack.

XRH datasets are normally oriented (resliced) in a way that a scroll through the stack along the XY plane emulates the physical histology slicing of the tissue."



An average intensity projection of the sample through the histologically relevant plane.

Available online: https://drive.google.com/file/d/1nPE58EjkVI1PvRGdpmG14t-Vg_0yBj_S/view

SourceVolumeFilename= 13330_20221010_XRH_3101_OLK_FMPA06681-
FIXED_14_2216x2568x2664x16bit.raw
SliceThickness= 20

ShortTitle= Average intensity projection thick slice roll - 20221012-15h10m

Description= "This is a 2D visualisation rendering the a Average Intensity of 20x single XY
slices along the z-axis of the stack.

XRH datasets are normally oriented (resliced) in a way that a scroll through the stack along
the XY plane emulates the physical histology slicing of the tissue."



A video of the scan data rotating.

Available online: <https://drive.google.com/file/d/1FOlkU6KyXd-utRkElOU4NlyBlxLurq6C/view>

Potential further Analysis

*** Field of view at centre of rotation - 116 mm x 116 mm ***

Useful links* and Information

About 3D X-ray Histology

- **Main XRH website:**
www.xrayhistology.org
- **The XRH team:**
www.southampton.ac.uk/muvis/xrh/xrh-people.page
- **Basic introduction to 3D X-Ray Histology (XRH):**
www.southampton.ac.uk/muvis/xrh/xrh-intro.page
- **Publications:**
www.southampton.ac.uk/muvis/xrh/xrh-publications.page

About your XRH session

- **XRH sessions are governed by a memorandum of collaboration.** The full text is available here: www.southampton.ac.uk/muvis/xrh/xrh-get-involved.page.
- **The work should be planned in anticipation of publication**
In any publication(s) the collaboration should be recognised with co-authorship of relevant XRH staff according to contemporary publishing practice;
eg: www.nature.com/authors/policies/authorship.html
- **XRH Wiki:** Training materials and tips to guide you through understanding, handling and interpreting your XRH data can be found in <https://sites.google.com/view/xrayhistologywiki/>.

About the facilities

- 3D X-Ray Histology (XRH): www.xrayhistology.org
- μ -VIS X-Ray Imaging Centre: www.muvis.org
- Biomedical Imaging Unit (BIU): www.southampton.ac.uk/biu/

About image analysis and visualisation

There are a number of volume visualisation and analysis software available, some of which are free and others are commercial products. A representative (but by no means exhaustive) list of tools that can be used for XRH can be found in our Wiki, along with step-by-step and getting started instructions.

<https://sites.google.com/view/xrayhistologywiki/software>

* The University of Southampton cannot accept responsibility for the content of external websites.

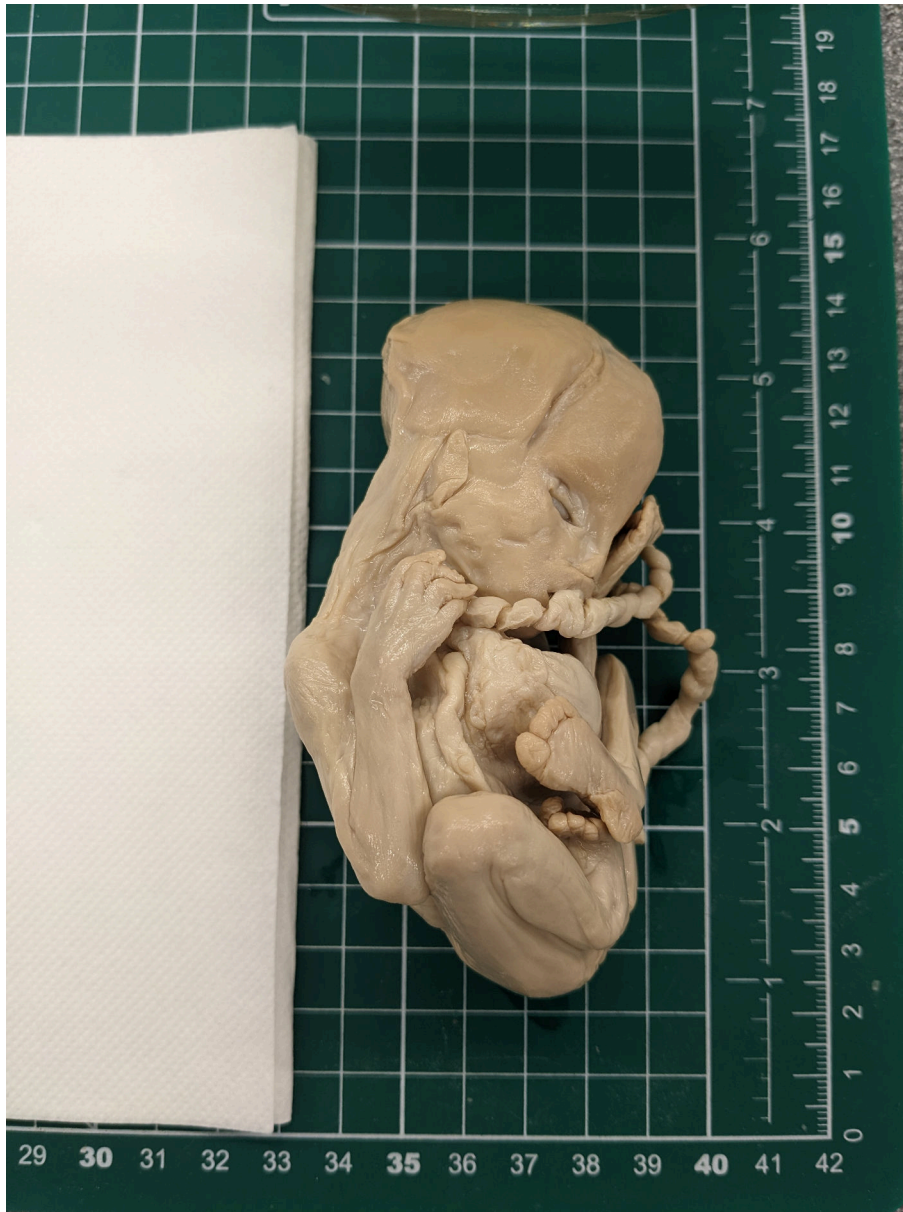
Appendix

Additional Information 20221010_XRH_3101_OLK_FMPA06681-FIXED_14

Scan Parameters

Parameter	Value
Scanner used	XRH
Total scan time (approx)	0:29:10
Binning	1x
Acceleration voltage	140 kVp
Current	107 μ A
Power	14.98 W
Angular projections	3501
Frames per projection	4
Exposure	125 ms
Analog Gain	30 dB
X-Ray head	Reflection 225 Multi-metal
Target metal	Tungsten
Filter material	None
Filter thickness	0.0 mm
Shuttling	No

Returned photo



Front of sample as returned.

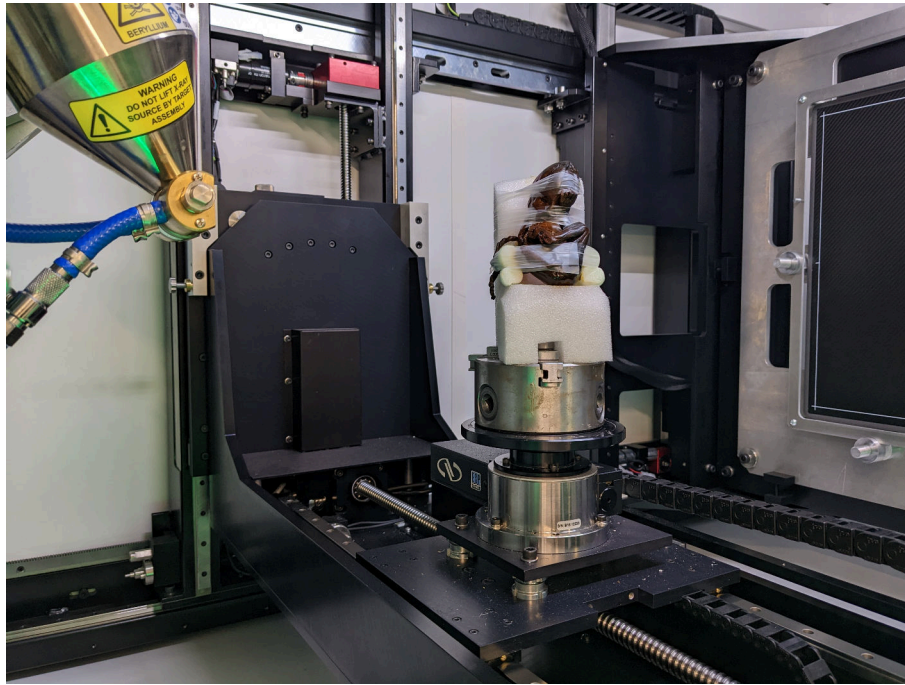
Other photos

scanning Setup



scanning Setup - 10x days in solution - 10/10/2022

scanning Setup in scanner



scanning Setup - 10x days in solution - 10/10/2022