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BIORESOURCE PAPER

Bioresource of Cervical Tissue Explants from Healthy Women

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The York Tissue Bank was established in 2013 at the University of York as a repository for cells and tissues to facilitate clinical and translational research at the university and with collaborative external tissue bank applicants. The bioresource described in this publication was initially established to conduct investigations into infection processes of sexually transmitted diseases in *ex vivo* organotypical models, specifically in uterine cervical tissue. Healthy human uterine cervical tissue is currently available to suitable applicants for ethically approved scientific research meeting the access criteria of the York tissue bank management committee.

Keywords: Human; healthy women; cervical tissue; endocervix; ectocervix; cryopreservation

Funding statement: Funding to support the bioresource is from University of York.

(1) Bioresource Overview

Project description

York Tissue Bank (YTB) is hosted within the Centre for Immunology and Infection in the Department of Biology and Hull York Medical School of the University of York and is approved by the Health Research Authority (National Research Ethics Service) Leeds East Research Ethics Committee (ref: 15/YH/0016); our license number granted by the Human Tissue Authority under section 16 (2) (e) (ii) of the Human Tissue act 2004 is 12604. The tissue bank is funded by the University of York with a cost-recovery model implemented for applicants to the biobank.

UK National Research Ethics Service (NRES 11/YH/0321) and Research & Development at York Teaching Hospital NHS foundation Trust (YORA01992) ethically approved a study entitled '*ex vivo* cervical implant systems for the analysis of viral infections and transmission blockade' with the University of York as sponsor. Tissue was initially collected to meet the requirements of this study but latterly, following amendment (substantial amendment 2 – 17/9/15) to the ethically approved protocol and re-consent of patients, where possible, specifically for the tissue bank and henceforth available for suitable tissue bank applicants to access.

Classification (1)

Human.

Species

Human.

Classification (2)

Biological samples.

Context

Spatial coverage

Description: samples were collected at York Teaching Hospital NHS Foundation Trust, The York Hospital, Wigginton Road York, UK, YO31 8HE.
Latitude: 53.971
Longitude: –1.08

Temporal coverage

Collection period was between 23rd March 2012 and 19th June 2014.

Temporal coverage for accessibility

No end date is applicable.

(2) Methods

Steps

Written informed consent using York Tissue Bank patient information sheets and consent forms was obtained from women willing to donate uterine cervical tissue who had normal cervical smears and were undergoing a planned hysterectomy for their own health. After hysterectomy the uterus was transported to the York Teaching Hospital NHS Foundation Trust histopathology department and reviewed macroscopically by the consultant histopathologist. Approximately 90% of normal, healthy, cervix was released and transported to the university for codification, processing and storage [1].

Stabilization/preservation
Released cervical tissue was transferred into leakproof sterile sample pots containing a transportation medium (Leibovitz's L-15 medium containing heat-inactivated single-batch 10% foetal bovine serum (FBS), 100 U/ml penicillin, 100 μg/ml streptomycin, and 2.5 μg/ml amphotericin B [all from Invitrogen, Paisley, UK]) and cooled to 4°C for transportation to the University of York. All samples subsequently underwent processing within four hours of surgery. Endo- and ecto-cervix were separated visually and tissue was cut into approximately 1 cm^3 cervical explant samples containing mucosal and submucosal tissue to maintain tissue architecture [2].

Type of long-term preservation
Cervical explant samples (~1 cm^3) were placed individually into 2 ml cryovials on ice containing 1 ml of a pre-cooled (4°C) freezing medium (90% FBS with 10% dimethyl sulfoxide) sufficient to ensure cryoprotectant reached all the tissue. Cryovials were then transferred immediately to a control rate freezer pre-cooled to 4°C (Planer KRYO560-16, Planer PLC, Sunbury-on-Thames, UK) and explants were cooled from 4°C to –50°C at 1°C/min and then from –50°C to –120°C at 10°C/min before transfer to liquid nitrogen for tissue banking [2].

Storage temperature
Liquid nitrogen: –196°C.

Shipping temperature from patient/source to preservation or research use
0–4°C (on ice).

Shipping temperature from storage to research use
–78°C (on dry ice).

Quality assurance measures
1. Cervical tissue was recovered and processed within four hours of surgery.
2. Reagents used in the transport and freezing were prepared freshly and were within their expiration date.
3. Freezer chamber temperature data was recorded as evidence of successful cycle completion; samples were transferred to liquid nitrogen immediately after controlled freezing.
4. Liquid nitrogen levels are monitored and refilled by centre staff; spare liquid nitrogen is always available at the university.
5. Access to liquid nitrogen tanks is restricted to centre staff/students working on clinical research projects.
6. Liquid nitrogen tanks are stored in a purpose-built environmentally regulated room with oxygen level detectors and a constant supply of electricity with a backup generator in case of power outage.
7. Liquid nitrogen tank temperatures are constantly monitored and logged; tanks are connected to an alarm system (mains operated and with a battery backup) that notifies centre staff if logged temperatures reach >–160°C or <–200°C for 30 minutes. Centre staff respond to call-outs within 30 minutes to investigate cause of alarm.
8. YTB has an internal standard operating procedure in place for quality management of samples and storage in addition to regular internal audits.

Source of associated data
The tissue was designated to be normal on histological examination; donor date of birth is available.

Ethics Statement
UK National Research Ethics Service (NRES 11/YH/0321) and Research & Development at York Teaching Hospital NHS foundation Trust (YORA01992) ethically approved the original study entitled '*ex vivo* cervical implant systems for the analysis of viral infections and transmission blockade', with University of York acting as the study sponsor. An amendment was latterly submitted to the Health Research authority ethics committee who approved the collection of cervical tissue for storage for future use under the universities HTA license within the York Tissue Bank; some patient samples collected prior to the amendment were re-consented, where possible. Written informed consent was obtained from women with normal cervical smears who needed to undergo a planned hysterectomy for their own health and who were willing to donate cervical tissue.

Constraints
N/A

(3) Bioresource description

Object name
Cervical tissue explant.

Bioresource name
York Tissue Bank.

Bioresource location
York Tissue Bank, Centre for Immunology and Infection, Department of Biology and Hull York Medical School, Wentworth Way, University of York, York, YO10 5DD, UK.

Bioresource contact
biol622@york.ac.uk
+44 (0)1904 32 8867

Bioresource URL
https://www.york.ac.uk/cii/clinicaltranslationalresearch/york-tissue-bank/

Identifier used
N/A

Bioresource type
Cell and tissue biobank.

Type of sampling
Population.

Anatomical site
Cervix.

Disease status of patients/source
Healthy women.

Clinical characteristics of patients/source
Healthy women undergoing planned hysterectomy.

Size of the bioresource
The bioresource contains cervical tissue from 16 women: ectocervix is available from every donor with a total of 195 samples available; endocervix is additionally available from two of 16 donors with four tissue samples available from each donor.

Donor number	Number of ectocervix samples	Number of endocervix samples
E0103	2	–
E0105	10	–
E0106	9	–
E0111	9	–
E0114	9	–
E0117	1	–
E0129	10	–
E0135	15	4
E0137	18	–
E0138	14	4
E0142	15	–
E0144	15	–
E0145	18	–
E0147	15	–
E0148	17	–
E0151	18	–

Vital state of patients/source
Healthy women.

Clinical diagnosis of patients/source
Healthy women undergoing planned hysterectomy.

Pathology diagnosis
N/A

Control samples
N/A

Biospecimen type
Cervical tissue: approximately 1 cm^3 tissue samples.

Size of the bioresource
The bioresource described includes cervical tissue from 16 women.

Release date
N/A

Access criteria
Application process is by request form completion accessible from the York Tissue Bank webpage with submission to the tissue bank manager who will pre-screen the application form for appropriate justification of use prior to review by the York tissue bank management group (YTBMG). Our SOP060, available from the tissue bank manager, details the process and paperwork required. All human sample transfers out of the university are under the auspices of a Material Transfer Agreement and only to a recipient that has appropriate ethical approval from a recognised research ethics committee or they are operating under a valid and appropriate HTA license, as evidenced by submission of a copy of their approvals/licenses or approval from the designated individual at the recipient institute. We require completion of a risk assessment for the handling and transportation of the sample(s) to the recipient. 16 donor samples are available, consisting of 203 1 cm^3 cervical explant samples. Costs are required to cover expenses associated with shipment to the applicant. Access is restricted to research applications from qualified professionals that have been ethically approved by the applicants' local research ethics committee. Applicants must guarantee to acknowledge the York Tissue Bank in any scientific publication. Research at the University of York and its collaborative partners is governed by the universities research policies and codes of practice https://www.york.ac.uk/staff/research/governance/research-policies/.

(4) Reuse potential

The cervical tissue could be used in any research project requiring normal primary human uterine cervical tissue; samples were originally obtained to establish an *ex vivo* organo-typical model to conduct viral infection studies of sexually transmitted diseases, as has previously been described for HIV infection studies [3]. Cryopreserved cervical tissue has been demonstrated to remain viable with preserved tissue architecture after thawing [2, 4, 5] and retain the ability to be infected [4]. The 1 cm^3 cervical explant samples available can be further processed (dissected into smaller pieces, section etc.) into viable appropriate sized pieces for the respective applicant so each cervical explant sample has the potential for multiple experiments or replicates.

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Competing Interests

The authors have no competing interests to declare.

Author Roles

James Fox: collector of Samples, York Tissue Bank Manager and York Tissue bank person designate.
Rebecca Wiggins: collector of Samples, ethical approval and York Tissue Bank person designate.
Charles Lacey: York Tissue Bank designated individual.

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