

Imperial College
London

Section of Gynaecologic Oncology

Maria Kyrgiou



Section of Gynaecologic Oncology



Academic Staff

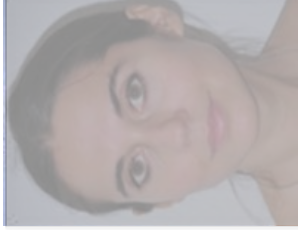
Maria Kyrgiou
Reader in Gynecologic Oncology



Nick Dibb
Reader in Cell Signalling



Sadaf Ghaem-Maghani
Professor in Gynecologic Oncology



Christina Fotopoulou
Professor of Practice

Cancer & Surgery



Richard Smith



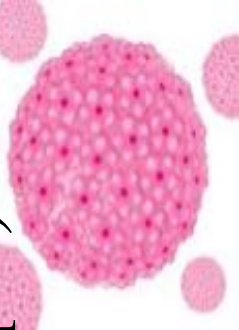
Alan Farthing

Honorary Senior Lecturers

Translational Research Themes & Challenges

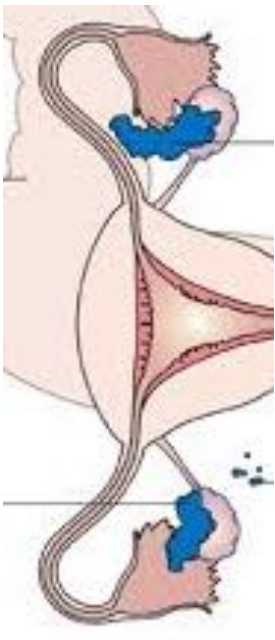
'Research that translates into patient benefit...'

Cervical (pre)Cancer



HPV persistence & Carcinogenesis

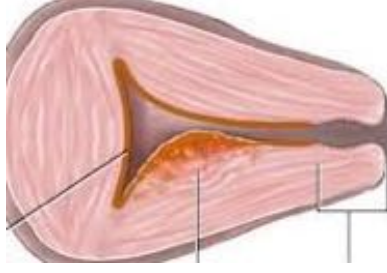
Ovarian Cancer



Early detection -
Chemotherapy
resistance



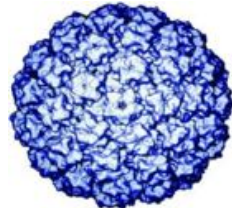
Endometrial Cancer



Incidence increase - Improve
Prevention
Treatment

Reproduction





Cervical Cancer Prevention & Management

The Cervical Cancer Subgroup

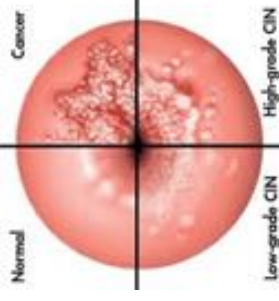
The System's
Biology

Genome

Epigenome

Microbiome

Metabonome



Cancer

James Flanagan

Bob Brown

Public Health

Marc Chadeau

Jarvelin Marjorita

Evangelos Evangelou

IRDB & Cancer

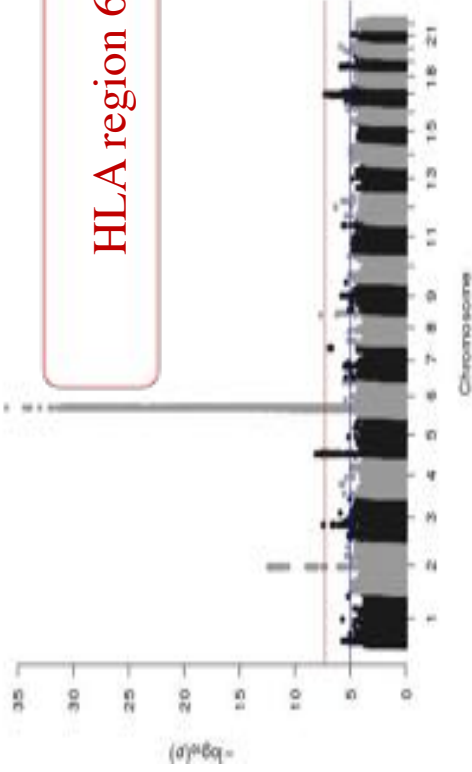
David MacInture

Philip Bennett

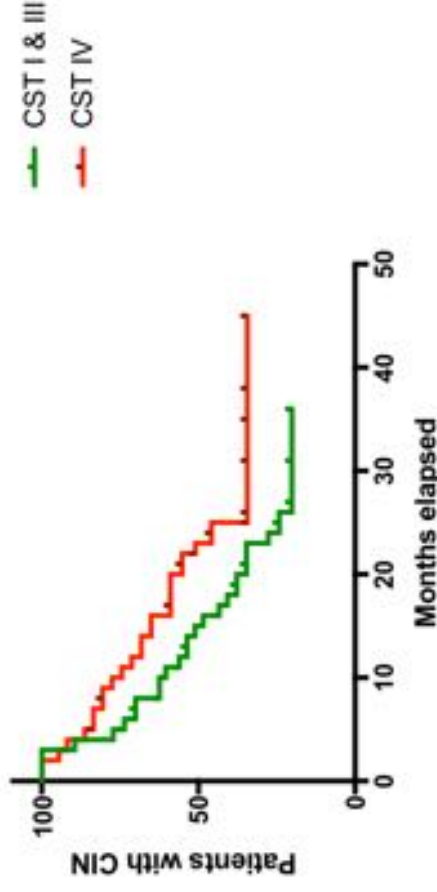
Julien Marchesi

Genome

Associations to cervical cancer and CIN in UKBioBank



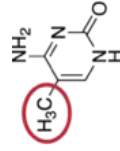
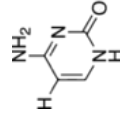
Microbiome



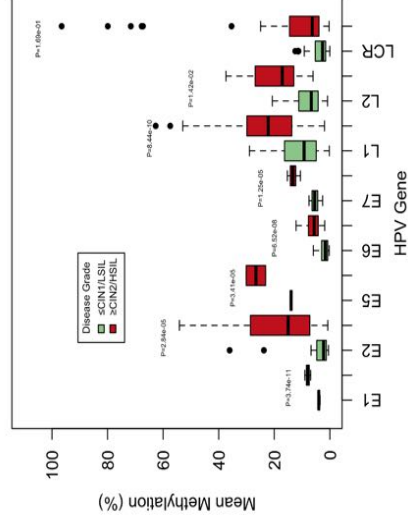
biobank

biobank

Epigenome

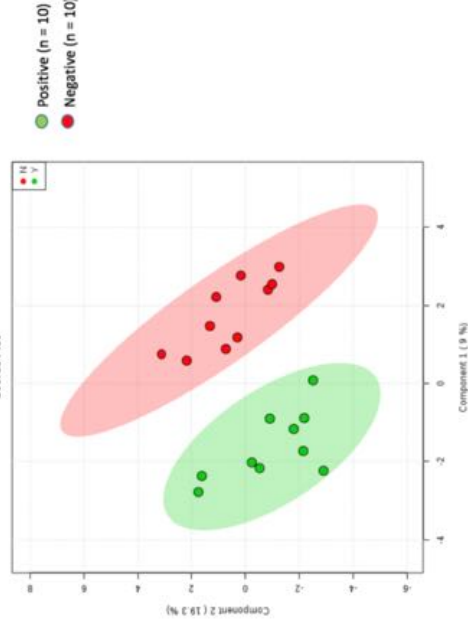


Cytosine methylated Cytosine



Metabonome

Laser REIMS -
iKnife

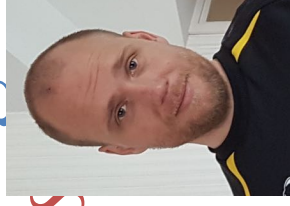


Mitra Sci Rep 2015; Mitra Sci Rep 2017; Mitra Microbiome 2017; Kyrgiou Trans Res 2017; Bowden 2019 (submitted); Tzafetas 2019 (submitted); Mitra Nat Comms 2019 (under revision)

Endometrial Cancer Prevention &

Management

Cancer & Metabolism S



**Epidemiological
research**

up – Obesity & Diabetes

Public Health

Kostas Tsilidis

Marc Gunter

Cancer

Hani Gabra

Jaya Nautiya

IRDB & Cancer

David MacInture

Philip Bennett

Ji ¹ ² ³ ⁴ ⁵ ⁶ ⁷ ⁸ ⁹ ¹⁰ ¹¹ ¹² ¹³ ¹⁴ ¹⁵ ¹⁶ ¹⁷ ¹⁸ ¹⁹ ²⁰ ²¹ ²² ²³ ²⁴ ²⁵ ²⁶ ²⁷ ²⁸ ²⁹ ³⁰ ³¹ ³² ³³ ³⁴ ³⁵ ³⁶ ³⁷ ³⁸ ³⁹ ⁴⁰ ⁴¹ ⁴² ⁴³ ⁴⁴ ⁴⁵ ⁴⁶ ⁴⁷ ⁴⁸ ⁴⁹ ⁵⁰ ⁵¹ ⁵² ⁵³ ⁵⁴ ⁵⁵ ⁵⁶ ⁵⁷ ⁵⁸ ⁵⁹ ⁶⁰ ⁶¹ ⁶² ⁶³ ⁶⁴ ⁶⁵ ⁶⁶ ⁶⁷ ⁶⁸ ⁶⁹ ⁷⁰ ⁷¹ ⁷² ⁷³ ⁷⁴ ⁷⁵ ⁷⁶ ⁷⁷ ⁷⁸ ⁷⁹ ⁸⁰ ⁸¹ ⁸² ⁸³ ⁸⁴ ⁸⁵ ⁸⁶ ⁸⁷ ⁸⁸ ⁸⁹ ⁹⁰ ⁹¹ ⁹² ⁹³ ⁹⁴ ⁹⁵ ⁹⁶ ⁹⁷ ⁹⁸ ⁹⁹ ¹⁰⁰ ¹⁰¹ ¹⁰² ¹⁰³ ¹⁰⁴ ¹⁰⁵ ¹⁰⁶ ¹⁰⁷ ¹⁰⁸ ¹⁰⁹ ¹¹⁰ ¹¹¹ ¹¹² ¹¹³ ¹¹⁴ ¹¹⁵ ¹¹⁶ ¹¹⁷ ¹¹⁸ ¹¹⁹ ¹²⁰ ¹²¹ ¹²² ¹²³ ¹²⁴ ¹²⁵ ¹²⁶ ¹²⁷ ¹²⁸ ¹²⁹ ¹³⁰ ¹³¹ ¹³² ¹³³ ¹³⁴ ¹³⁵ ¹³⁶ ¹³⁷ ¹³⁸ ¹³⁹ ¹⁴⁰ ¹⁴¹ ¹⁴² ¹⁴³ ¹⁴⁴ ¹⁴⁵ ¹⁴⁶ ¹⁴⁷ ¹⁴⁸ ¹⁴⁹ ¹⁵⁰ ¹⁵¹ ¹⁵² ¹⁵³ ¹⁵⁴ ¹⁵⁵ ¹⁵⁶ ¹⁵⁷ ¹⁵⁸ ¹⁵⁹ ¹⁶⁰ ¹⁶¹ ¹⁶² ¹⁶³ ¹⁶⁴ ¹⁶⁵ ¹⁶⁶ ¹⁶⁷ ¹⁶⁸ ¹⁶⁹ ¹⁷⁰ ¹⁷¹ ¹⁷² ¹⁷³ ¹⁷⁴ ¹⁷⁵ ¹⁷⁶ ¹⁷⁷ ¹⁷⁸ ¹⁷⁹ ¹⁸⁰ ¹⁸¹ ¹⁸² ¹⁸³ ¹⁸⁴ ¹⁸⁵ ¹⁸⁶ ¹⁸⁷ ¹⁸⁸ ¹⁸⁹ ¹⁹⁰ ¹⁹¹ ¹⁹² ¹⁹³ ¹⁹⁴ ¹⁹⁵ ¹⁹⁶ ¹⁹⁷ ¹⁹⁸ ¹⁹⁹ ²⁰⁰ ²⁰¹ ²⁰² ²⁰³ ²⁰⁴ ²⁰⁵ ²⁰⁶ ²⁰⁷ ²⁰⁸ ²⁰⁹ ²¹⁰ ²¹¹ ²¹² ²¹³ ²¹⁴ ²¹⁵ ²¹⁶ ²¹⁷ ²¹⁸ ²¹⁹ ²²⁰ ²²¹ ²²² ²²³ ²²⁴ ²²⁵ ²²⁶ ²²⁷ ²²⁸ ²²⁹ ²³⁰ ²³¹ ²³² ²³³ ²³⁴ ²³⁵ ²³⁶ ²³⁷ ²³⁸ ²³⁹ ²⁴⁰ ²⁴¹ ²⁴² ²⁴³ ²⁴⁴ ²⁴⁵ ²⁴⁶ ²⁴⁷ ²⁴⁸ ²⁴⁹ ²⁵⁰ ²⁵¹ ²⁵² ²⁵³ ²⁵⁴ ²⁵⁵ ²⁵⁶ ²⁵⁷ ²⁵⁸ ²⁵⁹ ²⁶⁰ ²⁶¹ ²⁶² ²⁶³ ²⁶⁴ ²⁶⁵ ²⁶⁶ ²⁶⁷ ²⁶⁸ ²⁶⁹ ²⁷⁰ ²⁷¹ ²⁷² ²⁷³ ²⁷⁴ ²⁷⁵ ²⁷⁶ ²⁷⁷ ²⁷⁸ ²⁷⁹ ²⁸⁰ ²⁸¹ ²⁸² ²⁸³ ²⁸⁴ ²⁸⁵ ²⁸⁶ ²⁸⁷ ²⁸⁸ ²⁸⁹ ²⁹⁰ ²⁹¹ ²⁹² ²⁹³ ²⁹⁴ ²⁹⁵ ²⁹⁶ ²⁹⁷ ²⁹⁸ ²⁹⁹ ³⁰⁰ ³⁰¹ ³⁰² ³⁰³ ³⁰⁴ ³⁰⁵ ³⁰⁶ ³⁰⁷ ³⁰⁸ ³⁰⁹ ³¹⁰ ³¹¹ ³¹² ³¹³ ³¹⁴ ³¹⁵ ³¹⁶ ³¹⁷ ³¹⁸ ³¹⁹ ³²⁰ ³²¹ ³²² ³²³ ³²⁴ ³²⁵ ³²⁶ ³²⁷ ³²⁸ ³²⁹ ³³⁰ ³³¹ ³³² ³³³ ³³⁴ ³³⁵ ³³⁶ ³³⁷ ³³⁸ ³³⁹ ³⁴⁰ ³⁴¹ ³⁴² ³⁴³ ³⁴⁴ ³⁴⁵ ³⁴⁶ ³⁴⁷ ³⁴⁸ ³⁴⁹ ³⁵⁰ ³⁵¹ ³⁵² ³⁵³ ³⁵⁴ ³⁵⁵ ³⁵⁶ ³⁵⁷ ³⁵⁸ ³⁵⁹ ³⁶⁰ ³⁶¹ ³⁶² ³⁶³ ³⁶⁴ ³⁶⁵ ³⁶⁶ ³⁶⁷ ³⁶⁸ ³⁶⁹ ³⁷⁰ ³⁷¹ ³⁷² ³⁷³ ³⁷⁴ ³⁷⁵ ³⁷⁶ ³⁷⁷ ³⁷⁸ ³⁷⁹ ³⁸⁰ ³⁸¹ ³⁸² ³⁸³ ³⁸⁴ ³⁸⁵ ³⁸⁶ ³⁸⁷ ³⁸⁸ ³⁸⁹ ³⁹⁰ ³⁹¹ ³⁹² ³⁹³ ³⁹⁴ ³⁹⁵ ³⁹⁶ ³⁹⁷ ³⁹⁸ ³⁹⁹ ⁴⁰⁰ ⁴⁰¹ ⁴⁰² ⁴⁰³ ⁴⁰⁴ ⁴⁰⁵ ⁴⁰⁶ ⁴⁰⁷ ⁴⁰⁸ ⁴⁰⁹ ⁴¹⁰ ⁴¹¹ ⁴¹² ⁴¹³ ⁴¹⁴ ⁴¹⁵ ⁴¹⁶ ⁴¹⁷ ⁴¹⁸ ⁴¹⁹ ⁴²⁰ ⁴²¹ ⁴²² ⁴²³ ⁴²⁴ ⁴²⁵ ⁴²⁶ ⁴²⁷ ⁴²⁸ ⁴²⁹ ⁴³⁰ ⁴³¹ ⁴³² ⁴³³ ⁴³⁴ ⁴³⁵ ⁴³⁶ ⁴³⁷ ⁴³⁸ ⁴³⁹ ⁴⁴⁰ ⁴⁴¹ ⁴⁴² ⁴⁴³ ⁴⁴⁴ ⁴⁴⁵ ⁴⁴⁶ ⁴⁴⁷ ⁴⁴⁸ ⁴⁴⁹ ⁴⁵⁰ ⁴⁵¹ ⁴⁵² ⁴⁵³ ⁴⁵⁴ ⁴⁵⁵ ⁴⁵⁶ ⁴⁵⁷ ⁴⁵⁸ ⁴⁵⁹ ⁴⁶⁰ ⁴⁶¹ ⁴⁶² ⁴⁶³ ⁴⁶⁴ ⁴⁶⁵ ⁴⁶⁶ ⁴⁶⁷ ⁴⁶⁸ ⁴⁶⁹ ⁴⁷⁰ ⁴⁷¹ ⁴⁷² ⁴⁷³ ⁴⁷⁴ ⁴⁷⁵ ⁴⁷⁶ ⁴⁷⁷ ⁴⁷⁸ ⁴⁷⁹ ⁴⁸⁰ ⁴⁸¹ ⁴⁸² ⁴⁸³ ⁴⁸⁴ ⁴⁸⁵ ⁴⁸⁶ ⁴⁸⁷ ⁴⁸⁸ ⁴⁸⁹ ⁴⁹⁰ ⁴⁹¹ ⁴⁹² ⁴⁹³ ⁴⁹⁴ ⁴⁹⁵ ⁴⁹⁶ ⁴⁹⁷ ⁴⁹⁸ ⁴⁹⁹ ⁵⁰⁰ ⁵⁰¹ ⁵⁰² ⁵⁰³ ⁵⁰⁴ ⁵⁰⁵ ⁵⁰⁶ ⁵⁰⁷ ⁵⁰⁸ ⁵⁰⁹ ⁵¹⁰ ⁵¹¹ ⁵¹² ⁵¹³ ⁵¹⁴ ⁵¹⁵ ⁵¹⁶ ⁵¹⁷ ⁵¹⁸ ⁵¹⁹ ⁵²⁰ ⁵²¹ ⁵²² ⁵²³ ⁵²⁴ ⁵²⁵ ⁵²⁶ ⁵²⁷ ⁵²⁸ ⁵²⁹ ⁵³⁰ ⁵³¹ ⁵³² ⁵³³ ⁵³⁴ ⁵³⁵ ⁵³⁶ ⁵³⁷ ⁵³⁸ ⁵³⁹ ⁵⁴⁰ ⁵⁴¹ ⁵⁴² ⁵⁴³ ⁵⁴⁴ ⁵⁴⁵ ⁵⁴⁶ ⁵⁴⁷ ⁵⁴⁸ ⁵⁴⁹ ⁵⁵⁰ ⁵⁵¹ ⁵⁵² ⁵⁵³ ⁵⁵⁴ ⁵⁵⁵ ⁵⁵⁶ ⁵⁵⁷ ⁵⁵⁸ ⁵⁵⁹ ⁵⁶⁰ ⁵⁶¹ ⁵⁶² ⁵⁶³ ⁵⁶⁴ ⁵⁶⁵ ⁵⁶⁶ ⁵⁶⁷ ⁵⁶⁸ ⁵⁶⁹ ⁵⁷⁰ ⁵⁷¹ ⁵⁷² ⁵⁷³ ⁵⁷⁴ ⁵⁷⁵ ⁵⁷⁶ ⁵⁷⁷ ⁵⁷⁸ ⁵⁷⁹ ⁵⁸⁰ ⁵⁸¹ ⁵⁸² ⁵⁸³ ⁵⁸⁴ ⁵⁸⁵ ⁵⁸⁶ ⁵⁸⁷ ⁵⁸⁸ ⁵⁸⁹ ⁵⁹⁰ ⁵⁹¹ ⁵⁹² ⁵⁹³ ⁵⁹⁴ ⁵⁹⁵ ⁵⁹⁶ ⁵⁹⁷ ⁵⁹⁸ ⁵⁹⁹ ⁶⁰⁰ ⁶⁰¹ ⁶⁰² ⁶⁰³ ⁶⁰⁴ ⁶⁰⁵ ⁶⁰⁶ ⁶⁰⁷ ⁶⁰⁸ ⁶⁰⁹ ⁶¹⁰ ⁶¹¹ ⁶¹² ⁶¹³ ⁶¹⁴ ⁶¹⁵ ⁶¹⁶ ⁶¹⁷ ⁶¹⁸ ⁶¹⁹ ⁶²⁰ ⁶²¹ ⁶²² ⁶²³ ⁶²⁴ ⁶²⁵ ⁶²⁶ ⁶²⁷ ⁶²⁸ ⁶²⁹ ⁶³⁰ ⁶³¹ ⁶³² ⁶³³ ⁶³⁴ ⁶³⁵ ⁶³⁶ ⁶³⁷ ⁶³⁸ ⁶³⁹ ⁶⁴⁰ ⁶⁴¹ ⁶⁴² ⁶⁴³ ⁶⁴⁴ ⁶⁴⁵ ⁶⁴⁶ ⁶⁴⁷ ⁶⁴⁸ ⁶⁴⁹ ⁶⁵⁰ ⁶⁵¹ ⁶⁵² ⁶⁵³ ⁶⁵⁴ ⁶⁵⁵ ⁶⁵⁶ ⁶⁵⁷ ⁶⁵⁸ ⁶⁵⁹ ⁶⁶⁰ ⁶⁶¹ ⁶⁶² ⁶⁶³ ⁶⁶⁴ ⁶⁶⁵ ⁶⁶⁶ ⁶⁶⁷ ⁶⁶⁸ ⁶⁶⁹ ⁶⁷⁰ ⁶⁷¹ ⁶⁷² ⁶⁷³ ⁶⁷⁴ ⁶⁷⁵ ⁶⁷⁶ ⁶⁷⁷ ⁶⁷⁸ ⁶⁷⁹ ⁶⁸⁰ ⁶⁸¹ ⁶⁸² ⁶⁸³ ⁶⁸⁴ ⁶⁸⁵ ⁶⁸⁶ ⁶⁸⁷ ⁶⁸⁸ ⁶⁸⁹ ⁶⁹⁰ ⁶⁹¹ ⁶⁹² ⁶⁹³ ⁶⁹⁴ ⁶⁹⁵ ⁶⁹⁶ ⁶⁹⁷ ⁶⁹⁸ ⁶⁹⁹ ⁷⁰⁰ ⁷⁰¹ ⁷⁰² ⁷⁰³ ⁷⁰⁴ ⁷⁰⁵ ⁷⁰⁶ ⁷⁰⁷ ⁷⁰⁸ ⁷⁰⁹ ⁷¹⁰ ⁷¹¹ ⁷¹² ⁷¹³ ⁷¹⁴ ⁷¹⁵ ⁷¹⁶ ⁷¹⁷ ⁷¹⁸ ⁷¹⁹ ⁷²⁰ ⁷²¹ ⁷²² ⁷²³ ⁷²⁴ ⁷²⁵ ⁷²⁶ ⁷²⁷ ⁷²⁸ ⁷²⁹ ⁷³⁰ ⁷³¹ ⁷³² ⁷³³ ⁷³⁴ ⁷³⁵ ⁷³⁶ ⁷³⁷ ⁷³⁸ ⁷³⁹ ⁷⁴⁰ ⁷⁴¹ ⁷⁴² ⁷⁴³ ⁷⁴⁴ ⁷⁴⁵ ⁷⁴⁶ ⁷⁴⁷ ⁷⁴⁸ ⁷⁴⁹ ⁷⁵⁰ ⁷⁵¹ ⁷⁵² ⁷⁵³ ⁷⁵⁴ ⁷⁵⁵ ⁷⁵⁶ ⁷⁵⁷ ⁷⁵⁸ ⁷⁵⁹ ⁷⁶⁰ ⁷⁶¹ ⁷⁶² ⁷⁶³ ⁷⁶⁴ ⁷⁶⁵ ⁷⁶⁶ ⁷⁶⁷ ⁷⁶⁸ ⁷⁶⁹ ⁷⁷⁰ ⁷⁷¹ ⁷⁷² ⁷⁷³ ⁷⁷⁴ ⁷⁷⁵ ⁷⁷⁶ ⁷⁷⁷ ⁷⁷⁸ ⁷⁷⁹ ⁷⁸⁰ ⁷⁸¹ ⁷⁸² ⁷⁸³ ⁷⁸⁴ ⁷⁸⁵ ⁷⁸⁶ ⁷⁸⁷ ⁷⁸⁸ ⁷⁸⁹ ⁷⁹⁰ ⁷⁹¹ ⁷⁹² ⁷⁹³ ⁷⁹⁴ ⁷⁹⁵ ⁷⁹⁶ ⁷⁹⁷ ⁷⁹⁸ ⁷⁹⁹ ⁸⁰⁰ ⁸⁰¹ ⁸⁰² ⁸⁰³ ⁸⁰⁴ ⁸⁰⁵ ⁸⁰⁶ ⁸⁰⁷ ⁸⁰⁸ ⁸⁰⁹ ⁸¹⁰ ⁸¹¹ ⁸¹² ⁸¹³ ⁸¹⁴ ⁸¹⁵ ⁸¹⁶ ⁸¹⁷ ⁸¹⁸ ⁸¹⁹ ⁸²⁰ ⁸²¹ ⁸²² ⁸²³ ⁸²⁴ ⁸²⁵ ⁸²⁶ ⁸²⁷ ⁸²⁸ ⁸²⁹ ⁸³⁰ ⁸³¹ ⁸³² ⁸³³ ⁸³⁴ ⁸³⁵ ⁸³⁶ ⁸³⁷ ⁸³⁸ ⁸³⁹ ⁸⁴⁰ ⁸⁴¹ ⁸⁴² ⁸⁴³ ⁸⁴⁴ ⁸⁴⁵ ⁸⁴⁶ ⁸⁴⁷ ⁸⁴⁸ ⁸⁴⁹ ⁸⁵⁰ ⁸⁵¹ ⁸⁵² ⁸⁵³ ⁸⁵⁴ ⁸⁵⁵ ⁸⁵⁶ ⁸⁵⁷ ⁸⁵⁸ ⁸⁵⁹ ⁸⁶⁰ ⁸⁶¹ ⁸⁶² ⁸⁶³ ⁸⁶⁴ ⁸⁶⁵ ⁸⁶⁶ ⁸⁶⁷ ⁸⁶⁸ ⁸⁶⁹ ⁸⁷⁰ ⁸⁷¹ ⁸⁷² ⁸⁷³ ⁸⁷⁴ ⁸⁷⁵ ⁸⁷⁶ ⁸⁷⁷ ⁸⁷⁸ ⁸⁷⁹ ⁸⁸⁰ ⁸⁸¹ ⁸⁸² ⁸⁸³ ⁸⁸⁴ ⁸⁸⁵ ⁸⁸⁶ ⁸⁸⁷ ⁸⁸⁸ ⁸⁸⁹ ⁸⁹⁰ ⁸⁹¹ ⁸⁹² ⁸⁹³ ⁸⁹⁴ ⁸⁹⁵ ⁸⁹⁶ ⁸⁹⁷ ⁸⁹⁸ ⁸⁹⁹ ⁹⁰⁰ ⁹⁰¹ ⁹⁰² ⁹⁰³ ⁹⁰⁴ ⁹⁰⁵ ⁹⁰⁶ ⁹⁰⁷ ⁹⁰⁸ ⁹⁰⁹ ⁹¹⁰ ⁹¹¹ ⁹¹² ⁹¹³ ⁹¹⁴ ⁹¹⁵ ⁹¹⁶ ⁹¹⁷ ⁹¹⁸ ⁹¹⁹ ⁹²⁰ ⁹²¹ ⁹²² ⁹²³ ⁹²⁴ ⁹²⁵ ⁹²⁶ ⁹²⁷ ⁹²⁸ ⁹²⁹ ⁹³⁰ ⁹³¹ ⁹³² ⁹³³ ⁹³⁴ ⁹³⁵ ⁹³⁶ ⁹³⁷ ⁹³⁸ ⁹³⁹ ⁹⁴⁰ ⁹⁴¹ ⁹⁴² ⁹⁴³ ⁹⁴⁴ ⁹⁴⁵ ⁹⁴⁶ ⁹⁴⁷ ⁹⁴⁸ ⁹⁴⁹ ⁹⁵⁰ ⁹⁵¹ ⁹⁵² ⁹⁵³ ⁹⁵⁴ ⁹⁵⁵ ⁹⁵⁶ ⁹⁵⁷ ⁹⁵⁸ ⁹⁵⁹ ⁹⁶⁰ ⁹⁶¹ ⁹⁶² ⁹⁶³ ⁹⁶⁴ ⁹⁶⁵ ⁹⁶⁶ ⁹⁶⁷ ⁹⁶⁸ ⁹⁶⁹ ⁹⁷⁰ ⁹⁷¹ ⁹⁷² ⁹⁷³ ⁹⁷⁴ ⁹⁷⁵ ⁹⁷⁶ ⁹⁷⁷ ⁹⁷⁸ ⁹⁷⁹ ⁹⁸⁰ ⁹⁸¹ ⁹⁸² ⁹⁸³ ⁹⁸⁴ ⁹⁸⁵ ⁹⁸⁶ ⁹⁸⁷ ⁹⁸⁸ ⁹⁸⁹ ⁹⁹⁰ ⁹⁹¹ ⁹⁹² ⁹⁹³ ⁹⁹⁴ ⁹⁹⁵ ⁹⁹⁶ ⁹⁹⁷ ⁹⁹⁸ ⁹⁹⁹ ¹⁰⁰⁰

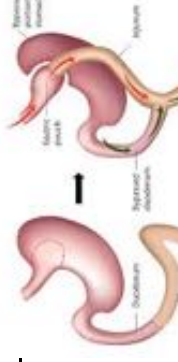
RPPA – Proteomics:
biobank samples – Bariatric



**Inflammation &
Vaginal microbiome:**
Biobank samples – Bariatric

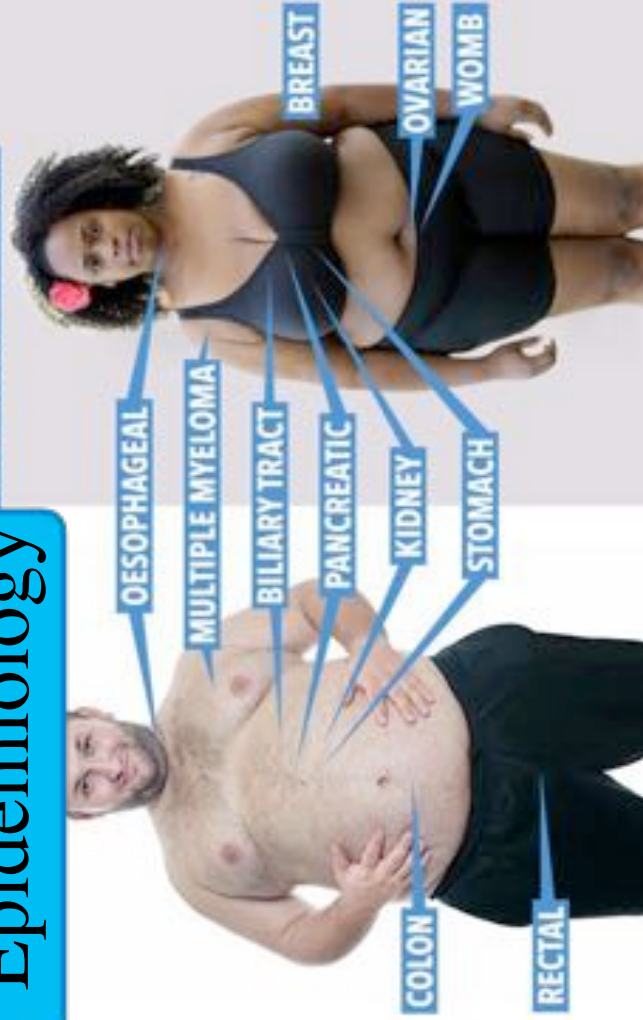


Metabonome:
Biobank – Bariatric - USS

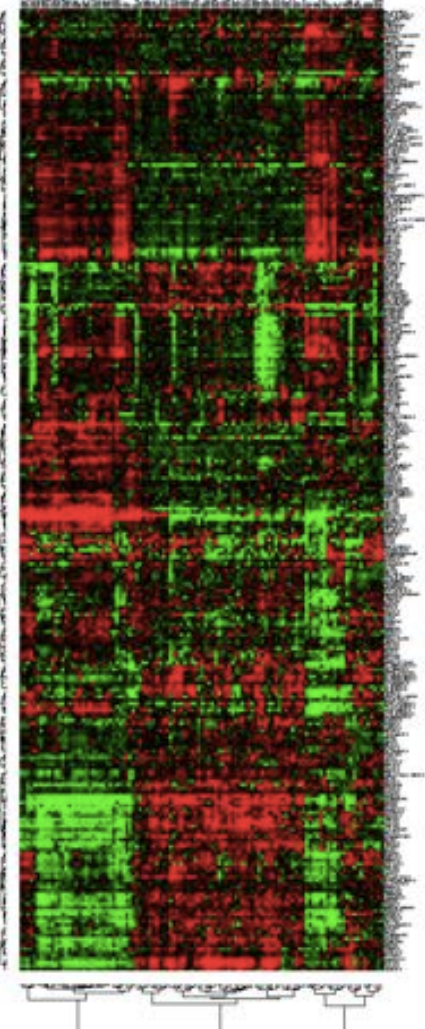


Epidemiology

RISK OF THESE 11 CANCERS

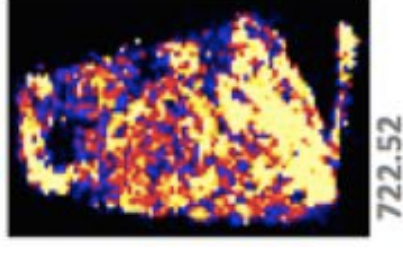
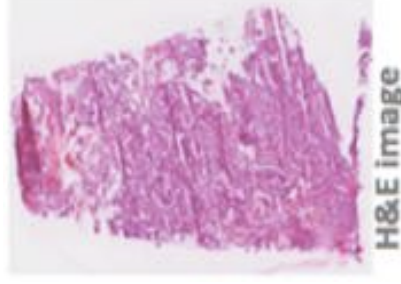


Proteomics

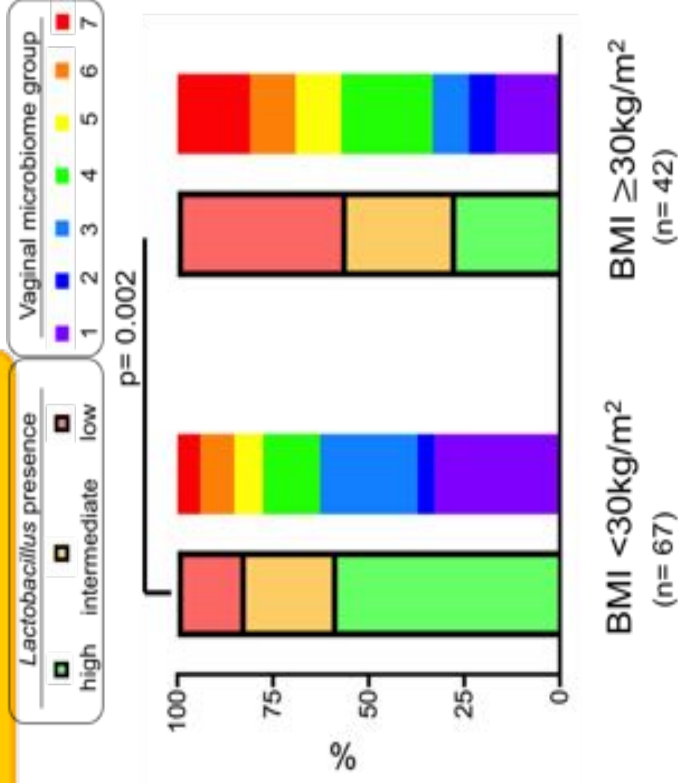


Metabonome

Ion image generated by DESI



Microbiome

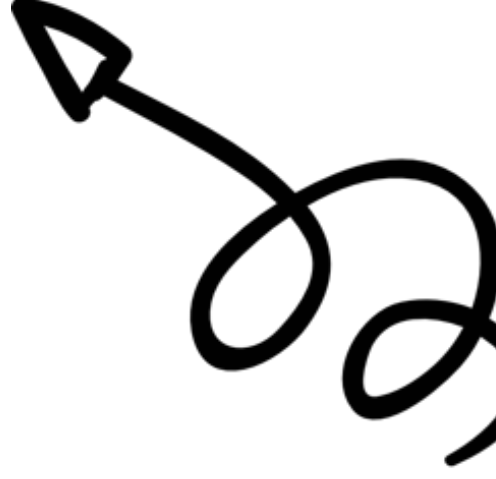


Kyrgiou BMJ 2017; Kallilala BMJ 2017; Raglan IJC 2018;
Raglan 2019 (submitted); Raglan 2019 (submitted)

How do we get from association to causality?



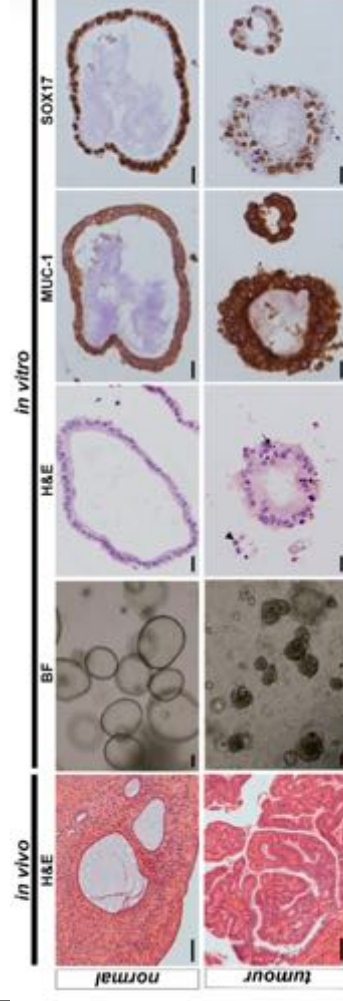
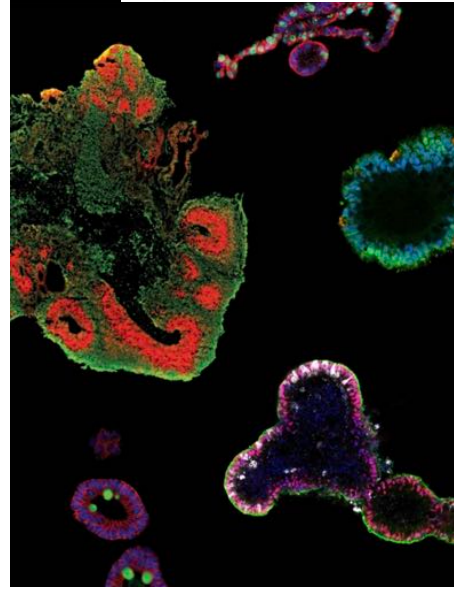
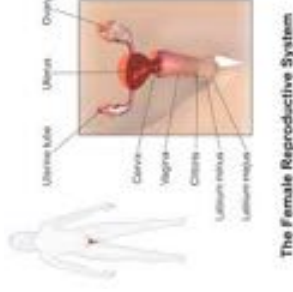
Genes
Epigenetics
Microbiome
Metabonomics



Disease
state

Gynaecological Cancers & Microbiome

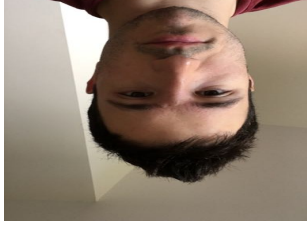
- o Explore in entire Female Genital tract
- o In other cancers: endometrial – ovary
- o Gut microbiome – chemo resistance
- o **Organoids**: a miniature and simplified version of the endometrium that shows realistic micro-anatomy - 3D culture - inoculate with microbial products & assess effects on pathways



Other Collateral Interests

Clinical Trials

- NOVEL trial – Chief Investigator – led by Imperial HPV vaccination after cone
- SHAPE – TRUST - STATEC



Cancer - Precancer Treatment & Reproduction

- Imaging studies
- Microbiome and immunity
- Network Meta-analysis



Epidemiological Work & Cochrane Reviews

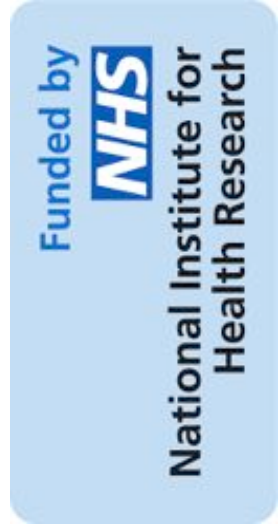
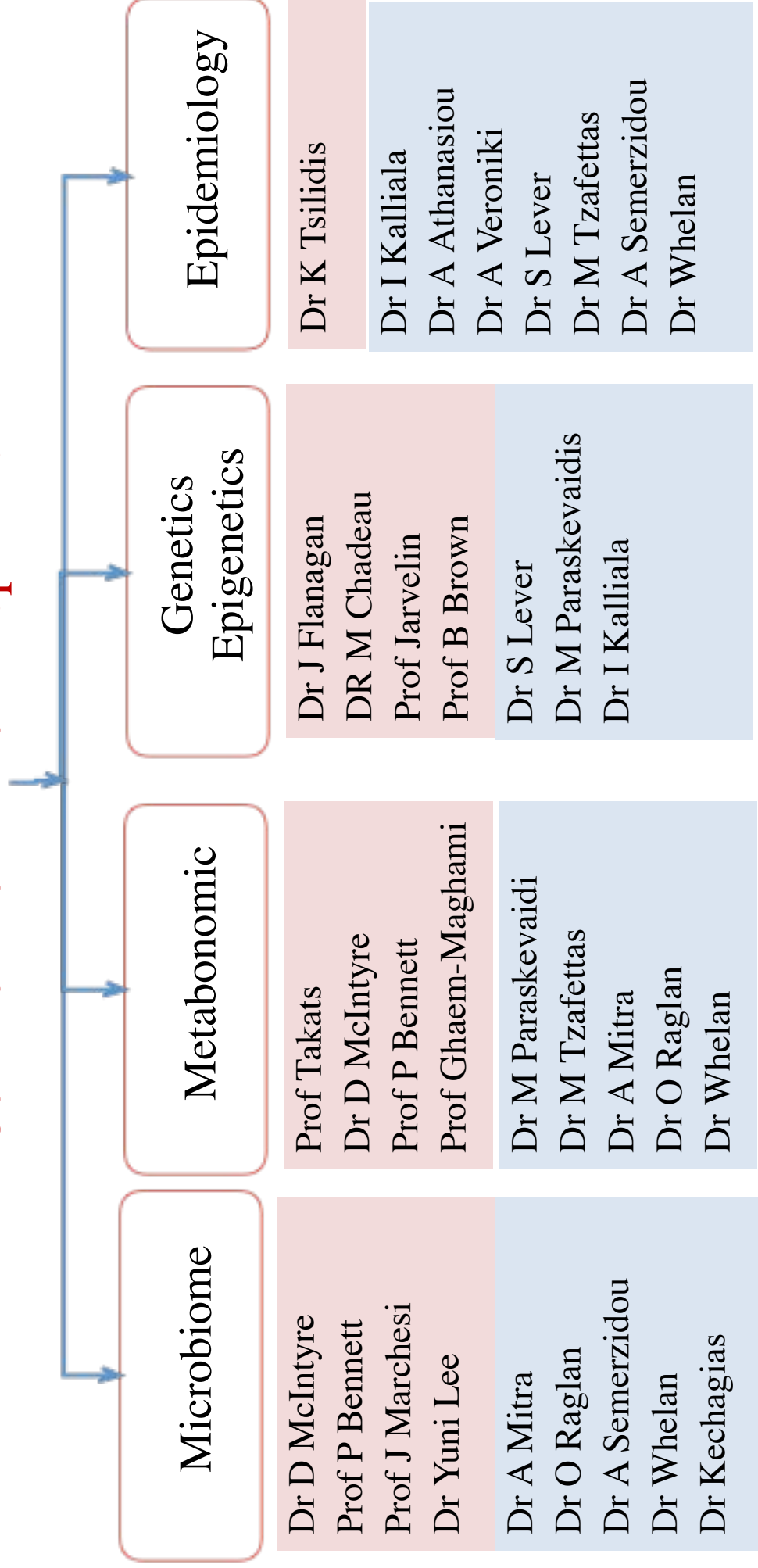
National Cancer Survivorship Agenda

- Modernise FU in GO pts
- Improve patients' satisfaction – PROM



Kyrgiou BMJ 2016; Kyrgiou Cochrane 2017; Kyrgiou BMJ 2014; Kyrgiou Cochrane 2015; Arbyn BMJ 2008; Kyrgiou Lancet 2006; Mitra 2019 (for submission); Beaver 2019

Collaborations across Departments





Personalising surgery for ovarian cancer

Diagnosis **Choosing treatment** **Is the treatment working?** **Prognosis**

National Phenome Centre - Pilot study

Diagnostic Prognostic Biomarkers & Targets

Immunological PD1/PD-L1

Surgical outcome

Epigenetics

iKnife

Surgical technology

IOTA- Diagnostics
Trans-IOTA
CT – MRI prediction surgery

Novel laparoscope

Clinical trials

- TΔ T-cell trials in design stage



Drug trials

- Immune Check point antibodies with drugs as a result of the work

Collaborations

Funding:

USDOD (CDMRP)

BRC

CRUK

NIHR

MRC

OCA

Computational Systems Medicine

Zoltan Takats
Jeremy Nicholson

Cancer

Bob Brown
Hani Gabra

Surgery

Dan Elson

Investigative Sciences

Andrea Rockall
Roberto Dina

10 PhDs

3 MDs

King's College
John Maher

Australia/Imperial
David Bowtell

Israel
Alberto Gabizone

Singapore A*
Insitute
Yin Yang

Brunel University
Andrew George



Personalising surgery for ovarian cancer

REGISTRATION OF SURGICAL EFFORT AND TUMOR BIOLOGY
PREDICTION OF SURGICAL AND CLINICAL OUTCOME

- Utilization of biopotential properties of cancerous tissue
- Spatial and temporal tumor heterogeneity
- Biomechanics of lymphatic tissue
- Radiomics and prediction of surgical and clinical outcome

**Martyn Boutelle,
Manos Drakakis**

**Paula Cunnea
Ed Curry
Iain McNeish**

James Moore

Eric Aboagye

Uterine Transplant, Fertility Restoration & Vulva Disease

- **Uterine transplantation research & clinical programme:**

- Deceased donors
- Living donor cases
- Side projects: questionnaire, perception etc

- **Endometrial transplantation (ETx)**

- Endometrial autotransplant short term feasibility study in rabbits completed

- **Endometrial Regeneration through Bioengineering**

- Collaboration with The Stevens Group, a Regenerative Medicine and Tissue Engineering research group
- Developed novel biomaterial to target intrauterine adhesions and 3D *in vitro* endometrial models & *In vivo* mouse studies to test biomaterial in an intrauterine scarring model to start October 2019

- **Use of plasmajet in vulval intra-epithelial neoplasia**

- **Use of calcium electroporation in vulval cancer**





Receptor signalling and kinase inhibitor studies in cancer & reproduction

RNA splicing and microRNA function in stem cells

MicroRNAs and isomiRs

Previously published that microRNA variants (isomiRs) are functional, that small changes to the 5' end of a microRNA have a big impact upon mRNA targeting and that different tissues sometimes express different 5' isomiRs (Tan et al 2014 NAR).

Currently Some miRNAs ligate poorly to the 3' or 5' primers used in the standard Illumina cloning kit and are therefore under represented in probably all miRNA sequencing databases.

We (Catherine Long, PhD student, Leandro Castellano) have:

1. Improved ligation to the 3' primer (easy)
2. Improved ligation to the 5' primer (difficult)
3. Introduced an optional pulldown step for individual miRNAs and their isomiRs, which will greatly simplify their analysis and sequencing.

Background splicing and genetic disease

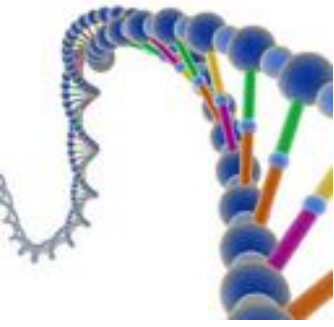
Previously established that the css that are activated in genetic disease are already used at a low level by normal genes. This was done by comparing cDNA databases to databases of aberrant splicing (Kapustin et al 2011 NAR).

Currently comparing much larger RNA sequencing databases to aberrant splicing databases for genetic disease and cancer (collaboration with Igor Vorechovsky, Leandro Castellano, present and past lab members). We have discovered:

That we can reasonably predict whether a splice site mutation will cause css activation (and identify the likely site), single exon skipping, multiple exon skipping or some combination.

That aberrant splicing in cancer does not, as reported, create novel splicing events but instead enhances background splicing events.

That background splicing is also informative about pseudoexon activation, recursive splicing (this is used to remove large introns) and the use of antisense oligos to modulate splicing for therapeutic purposes.



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Personalised care...

Supporting
great science
excellent patient care
and a healthier community



Thank you...

Aim:

To improve Oncologic & Reproductive outcomes for patients...



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great science
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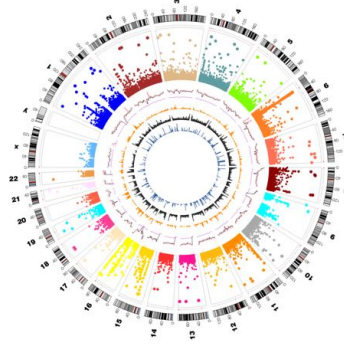
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Acknowledgements



Personalised care...



Funded by



National Institute for
Health Research

Dr Nick Dibb. Background splicing and genetic disease

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3. That background splicing is also informative about pseudoexon activation, recursive splicing (this is used to remove large introns) and the use of antisense oligos to modulate splicing for therapeutic purposes.

Fertility Restoration

- **Uterine transplantation research programme:**
 - Deceased donors:
 - Investigational Study Into Transplantation of the Uterus (INSITU study)
 - HRA REC Ethics approval
 - 10 cases
 - NHSBT approval (RINTAG, NODC, NRG, SMT)
 - Sponsor approval to begin screen February 19th 2019
 - Funding by WTUK – first 3 cases secured – ongoing fundraising in progress
 - 199 women consented for pre-screen – 77 meet criteria
 - 10 invited to clinic for investigation and counselling
 - NHSBT go live date – November 2019

Fertility Restoration

- **Uterine transplantation clinical programme:**
 - Living donor cases:
 - First 2 cases planned January 2020
 - Sister / Sister donor / recipient pairs
 - Investigated, counselled and embryos created
- **Uterine transplantation side projects:**
 - Questionnaire assessing perceptions, motivations and acceptability towards altruistic uterine donation
 - Ongoing data collection (currently n=140)
 - Questionnaire assessing transgender women's perceptions towards uterine transplantation to determine potential demand in future
 - Data collected – currently being analyses (n=150)
 - The role of the microbiome in uterine transplantation
 - Impact upon clinical and reproductive outcomes
 - The use of multi-spectral imaging in uterine transplantation
 - To assess oxygenation post anastomosis

Fertility Restoration

- **Endometrial transplantation (ETx)**
 - Endometrial autotransplant short term feasibility study in rabbits completed (n=10)
 - Worlds first reported pregnancies achieved following ETx
 - Confirmed feasibility of procedure / controlled for endometrial regeneration
 - Endometrial allotransplant short term feasibility study in rabbits currently underway (n=12)
 - All rabbits currently alive and well
 - Currently undergoing IVF – outcomes expected November 2019
 - Ethics for human cases to be submitted following outcomes in animal allotransplant study

Tissue Preservation

- **Use of plasmajet in vulval intra-epithelial neoplasia**
 - Tissue sparing treatment modality
 - Data currently being analysed from last 5 years
- **Use of calcium electroporation in vulval cancer**
 - Initial promising results

Endometrial Regeneration through Bioengineering

- Collaboration with The Stevens Group, a Regenerative Medicine and Tissue Engineering research group, Imperial College London
- Developed novel biomaterial to target intrauterine adhesions
- Novel biomaterial also used to support 3D *in vitro* endometrial models
- *In vivo* mouse studies to test biomaterial in an

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Personalising surgery for ovarian cancer

Sadaf Ghaem-Maghani
Reader in Gynaecological Oncology