

Infectious Diseases BioBank at King's College London.

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ABSTRACT

Background: The King's College London Infectious Diseases BioBank at was opened in 2007 and part of the core remit of this project is the collection of samples from patients infected with HIV.

Methods: Peripheral venous bloods are collected from patients infected with HIV, hepatitis-B virus or, with bacteraemias, as well as hospital controls and healthy subjects. Blood samples are fractionated into plasmas, viable lymphocytes and DNA. All donations are from subjects who have given 'open consent' so that these samples can be used for virtually any type of biomedical research. Longitudinal samples from HIV+ patients with unusual clinical histories (fast progressors, new to HAART and long-term non-progressors) are selectively recruited and archived.

Results: At present the HIV component of the BioBank consists of around 35,000 aliquots, comprising of different blood fractions from over 500 donations from 180 HIV+ patients. These samples are currently being accessed by studies investigating host retroviral restriction factors, pathogen diversity and immune responses to infection.

Conclusion: The King's College London Infectious Diseases BioBank is a rapidly expanding resource of blood fractions from HIV patients which together with similar resources such as the Spanish HIV BioBank will expedite translational research into this infection.

INTRODUCTION

The BioBank is embedded within the KCL Department of Infectious Diseases and is affiliated to Guy's and St Thomas' Hospitals National Health Service (NHS) Trust which act as tissue collection centers (TCC). Infectious diseases are problematic in our area. Indeed, one percent of women attending ante-natal clinics at St Thomas' Hospital are HIV positive and, together, clinics at the three TCCs care for about 5,000 HIV+ patients.

The BioBank is run by a Governance Committee which is empowered to act as a local research ethics committee and provide ethical opinions for studies which apply to use BioBank samples.

RECRUITMENT.

Nurses at TCCs identify patients of interest as well as hospital controls and inform them of the BioBank *via* information sheets. At their next routine visit, subjects are invited to participate. Healthy subjects are recruited *via* posters and are incentivized with gift vouchers. If subjects agree to participate, they sign consent

forms which details possible risks or discomforts associated with the procedures and the open-ended nature of the research that their samples will be used for. All subjects have the option to withdraw their permissions and either leave their samples in the repository or, have them destroyed.

TYPES OF SAMPLES COLLECTED.

The BioBank has permission to collect two categories of clinical materials: (i) 'research samples' of peripheral venous blood (PVB), urine and faeces and, (ii) 'residual samples', *i.e.* any excess tissues, biopsies, swabs or bodily fluids collected primarily for diagnostic purposes. Either type of sample can be collected from any patient (who is a conscious adult, but neither a prisoner nor mentally impaired) attending a routine clinical appointment and who is suffering from any infectious or inflammatory condition at any TCC registered by the BioBank at any NHS location in England, Wales or Northern Ireland. PVB are fractionated into plasmas, viable lymphocytes and DNA.

SAMPLES ARCHIVED.

To date, the BioBank has collected PVB from 20 healthy subjects (as of January 2010, n=60 sample donations) and 60 non-infected hospital controls (60 donations), 85 patients with hepatitis B (85 donations), 250 with bacteraemias (250 donations), as well as from 180 patients with HIV (550 donations).

TCCs specifically recruit longitudinal samples from HIV patients with interesting or unusual clinical histories namely: (i) patients before and after the initiation of highly-active anti-retroviral therapy (HAART); (ii) fast progressors (<500 CD4+ cells/mm³ within four years) (iii) patients who may eventually fulfill the criteria of long-term non-progressors (LTNP: with undetectable or low viral loads, stable CD4+ cell numbers, long periods of clinical latency *etc.*); and (iv), 'probable' LTNPs which includes ten (7.2%) patients who fulfill the LTNP, and three (2.1%) the 'elite' LTNP, criteria of Grabar *et al.* (2009). For comparison, rates of LTNP and elite LTNP amongst HIV+ patients in France are 0.4% and 0.05% respectively. Patients not receiving HAART are specifically targeted for recruitment and in all cases longitudinal samples are collected.

ACCESSING SAMPLES.

Researchers wishing to use BioBank samples are provided with an information pack and must obtain a positive ethical opinion and project approval by the governance committee. BioBank samples are donated with 'open consent' so that virtually any type of immunological, genetic or microbiological testing can be performed on them. Exclusions being studies which involve: (i) testing of safety of cosmetics or consumer

products (ii) animal research; (iii) investigations into the termination of pregnancy or reproductive cloning; and, (iv) stem cells.

After approval, researchers sign a materials transfer agreement (MTA) then the BioBank provides samples together with a file containing technical and clinical information. Until present all such samples have been provided *pro bono*, however a discretionary charge to subsidize processing and storage costs will be introduced: it is anticipated that this will be incorporated into researchers grant applications. The types of studies currently using the BioBank include: investigations of DNA polymorphisms of the restriction factor tetherin and the viral permissivity factor ps20; functional studies of regulatory T-cells; and, HIV sequencing studies.

QUALITY CONTROL.

The BioBank is a member of the International Society for Biological and Environmental Repositories and has based its SOPs upon UNE-EN-ISO 9001:2000 in order to facilitate future inter-biobank networking capabilities.

Pre-analytic variation is a major source of experimental error and PVBs are collected from HIV+ patients and processed within a collection-to-freezer a window of <24 hours and a target of freezing >75% of PVB samples within 4 hours of venepuncture. All freezers are alarmed to personal telephones and are checked routinely for temperature fluctuations. Plasmas and PBMC released to researchers have not undergone a freeze-thaw cycle and all DNA samples are quantified (by semi-quantitative agarose-gel electrophoresis against standards and by NanodropTM measurements) and tested for polymerase chain reaction viability (by amplification of the human β -globin gene).

SUMMARY.

The KCL ID BioBank represents a rapidly growing resource at King's College London which is archiving valuable collections for infectious diseases research.

