

## **The Francis Crick Institute – Written evidence (COV0033)**

### **Introduction**

The Francis Crick Institute is dedicated to understanding the fundamental biology underlying health and disease. Our state-of-the-art building in central London brings together 1,500 scientists, students and support staff working across disciplines, making it the biggest biomedical research facility under a single roof in Europe.

Crick scientists paused their research when lockdown began; access to the building was restricted, while the clinical trials some of their research depends on were paused. At the same time, we identified unique Crick strengths that could be leveraged to contribute to the UK's response to the pandemic. Our comprehensive COVID-19 research programme brings together a team of over 100 world-leading scientists across 12 laboratories.

### **Our COVID-19 research response**

The Crick's COVID-19 research seeks to answer questions organised into five themes, set out below. The establishment of a repository of COVID-19 samples housed at the Crick underpins the research, advancing our understanding of the virus and guiding the development of new tests, treatments and vaccines.

#### **1. Diagnosis – methods, methods evaluation and methods development**

##### **Improving diagnostic testing**

The Crick has set up a testing centre for SARS-CoV-2 – in collaboration with UCLH NHS Foundation Trust and its diagnostic partner Health Services Laboratories. The experience of developing and operating our testing infrastructure, combined with our strengths in immunology and molecular biology, puts us in a strong position to develop, compare and evaluate new diagnostic methods to improve the speed, accuracy, and cost of mass testing. A particular area of focus for us is the development of simple methods that can be used at the point of patient care, without the need for specialised equipment or expertise.

#### **2. Immunity and immunopathology – testing and mechanisms**

##### **Understanding who has already had the virus**

Our scientists are developing a number of techniques to detect antibodies in the blood and identify whether someone has had COVID-19. This work will also determine how effective these antibodies are at preventing the virus from infecting human cells and how long the antibody response to the virus lasts.

##### **Understanding why some cases are much worse than others**

The Crick, King's College London and Guy's and St Thomas' NHS Foundation Trust have built a high-throughput platform, looking at patients' blood over time to see how the immune system responds to COVID-19. Better understanding of our immune response could help doctors predict who may need intensive care, and may aid in the development of treatments and vaccines.

#### **3. Molecular mechanisms and target identification**

Given the uncertainties around immunity to SARS-CoV-2 and how long it lasts, there is a critical need to develop effective anti-viral treatments. We're

investigating fundamental questions about the molecular mechanisms that enable SARS-CoV-2 to function, multiply, and spread with the aim of uncovering new ways to treat the infection. Our facilities will enable researchers to safely isolate SARS-CoV-2 from patient samples and study it within a tightly controlled setting using genetic, chemical, and computational approaches.

Given the uncertainties around immunity to SARS-CoV-2, there is a critical need to develop effective anti-viral treatments. Understanding what drives the virus' lifecycle will unveil anti-viral targets and enable us to perform initial screens for inhibitory molecules. The Crick has well established partnerships with industry. Industry scientists from AstraZeneca, GSK and MSD work closely alongside Crick researchers to speed up the discovery and development of new treatments.

#### **4. Clinical epidemiology and clinical management**

##### **How coronavirus is transmitted and whether it is evolving**

There is an urgent need to understand how the quantity, source, and complexity of the virus impacts the severity of SARS-Cov-2 infection. The Crick's platforms for viral diagnosis (theme 1) and our close links to hospital partners at the centre of the current epidemic, are enabling us to advance our understanding of these factors and improve clinical management of the disease.

With our partners, UCLH, Crick researchers are collaborating on the SAFER study. SAFER stands for **S**ARS-CoV-2 **A**cquisition in **F**rontline Healthcare Workers – **E**valuation to inform **R**esponse. The longitudinal cohort study will help researchers to understand more about the transmission of the virus, including amongst those with no symptoms and those with antibodies. Initial findings from the first month will be published in July 2020.

#### **5. Clinical epidemiology and clinical management in vulnerable populations**

##### **How COVID-19 is affecting cancer treatments**

COVID-19 is creating major challenges for clinicians delivering care to vulnerable individuals, such as those with cancer, which could significantly impact a patient's prognosis.

Through a collaboration with the Royal Marsden NHS Foundation Trust, our researchers are investigating how cancer patients can obtain the anti-cancer treatments they need in the safest possible way. The study aims to determine how cancer type, disease stage, different cancer treatments, host genetics and host immune response could affect the severity of a patient's infection and their chance of survival and the impact on their cancer. This will help inform clinical guidance, avoid long-term impacts on cancer patients, and help protect vulnerable people in hospitals.

**Scientific and social impact are at the core of our COVID-19 research programme. Our aim is to generate key biomedical outputs that will advance the scientific field and inform health protocols, ultimately protecting the public and saving lives.**

*29 June 2020*