MEGA: ME/CFS Epidemiology and Genomics Alliance

On the 13th and 14th of April, experts from the following fields came together for a 'grand challenge' workshop to discuss how to advance research in understanding CFS/ME:

- Genomics - Prof George Davey-Smith (Bristol), Prof Chris Ponting (Edinburgh), Prof Colin Smith (Brighton)
- Epigenetics - Prof Caroline Relton (Bristol)
- Proteomics (Mr Tony Bartlett, Somalogic)
- Metabolomics (Dr Rick Dunn, Birmingham)
- Routinely collected data - Prof Andrew Morris (Edinburgh) and Prof David Ford (Swansea)
- Infection - Prof Paul Moss (Birmingham)
- Sleep - Prof Jim Horne (Loughborough)
- Pain - Prof Maria Fitzgerald (UCL)
- Primary care - Prof Paul Little (Southampton)

Joining them at the workshop was Sonya Chowdhury (Action for M.E., representing the patient charity members of the UK CFS/ME Research Collaborative Board) and CFS/ME researchers:

- Prof Julia Newton (Newcastle)
- Prof Peter White (QMUL)
- Dr Esther Crawley (Bristol)
- Dr Simon Collin (Bristol).

The workshop included presentations from each expert about how their field could help advance research in CFS/ME. Although CFS/ME is common and disabling, little is understood about the causes or underlying biology. CFS/ME is probably not just one illness and so far, definitions have been based on symptoms which may not be related to the underlying biology. Everybody agreed there was considerable benefit from such a strong collaboration bringing together differing scientific perspectives, skills and techniques.

It was agreed that very large numbers of people would need to be involved in a study to enable us to conduct the necessary genomic studies. This is likely to need at least 10,000 adults and 2,000 children and young people plus many more others who would act as controls. The patients would need to be well described (phenotyped) with more detail than has previously been collected on characteristics such as pain and sleep patterns.

In this big data study, the first of its kind in the UK, each patient will be asked to provide blood and urine samples which would then allow researchers to investigate, in terms of DNA, RNA and other molecules, what distinguishes individuals with CFS/ME from controls. In other words, what are the distinctive genetics, epigenetics, proteomics and metabolomics of CFS/ME? Doing this will allow us to understand more about the causes and underlying biology of CFS/ME but also about the different types (sub-phenotypes) which may be caused by different underlying mechanisms. This may eventually enable us to develop new diagnostic tests and new treatments for each sub-phenotype.

The researchers involved in MEGA will actively engage with researchers world-wide to further replicate and investigate findings. This very large collection of samples and data will be of interest to researchers from a wide range of disciplines.

We anticipate applying for funding at the end of 2016. If successful, data and sample collection will start late in 2017. Work is now being undertaken to further develop the collaboration and

application. A study of this scale will require considerable funding and may need a two-phase approach.

The group discussed how engagement of people with ME/CFS and participation during development of the study will be essential. This will include establishing advisory groups, for adults as well as for children and young people with CFS/ME. The group also considered the importance of maintaining good two-way communication with the wider community and providing updates on the progress being made.

Each of the workshop participants agreed to contribute blog posts about the roles of their respective field and the benefit this could bring to the CFS/ME research. These are being prepared and will be published over the next few months.