

The need for a rapid and integrated European research response to the emergence of Middle East respiratory syndrome coronavirus (MERS-CoV)

In May of this year WHO director-general Margaret Chan declared MERS-CoV her greatest concern during the 66th World Health Assembly in Geneva. The MERS-CoV emerged in the Middle East, with the earliest known cluster of infections occurring in Jordan in April 2012. By mid July 2013, 82 laboratory-confirmed cases of MERS have already been registered by WHO, including 45 deaths.

Europe must be considered one of the most likely continents to which MERS could spread. Human-to-human transmission has already been shown for MERS-CoV upon close contact. As also illustrated by the evolution of SARS-CoV 10 years ago, further adaptation to the human host is possible in the case of MERS-CoV, with unpredictable consequences for transmission and disease. Now a short window of opportunity exists to address important knowledge gaps in support of the development and implementation of adequate MERS-CoV prevention and containment strategies, including public health recommendations, diagnostics, vaccines and antiviral compounds. In the words of Dr. Chan: *“We understand too little about this virus when viewed against the magnitude of its potential threat. Any new disease that is emerging faster than our understanding is never under control”*.

Investigators from EMPERIE, ANTIGONE, PREDEMICS, SILVER, EVA and PREPARE, together with other European research groups that are worldwide leaders on different aspects of coronavirus research have joined in this MERS-CoV Initiative (MERC I)¹. Together with the government sectors involved they have been at the frontline of Europe’s research response to MERS-CoV. From the first discovery of MERS-CoV to its genomic characterisation, the development of diagnostic tests, the determination of its host receptor, pathogenesis studies and initial evaluation of antiviral drugs, they have been crucial in providing health authorities with the necessary knowledge and tools for developing policy recommendations in response to this new health threat. Building on the effort put in by government sectors as well as research networks, we need a more integrative, more responsive response linking government efforts to the research capacity in the academic sectors in a systematic way.

The MERS-CoV research performed thus far by the MERC I investigators has primarily been financed through the aforementioned EU FP7 projects. These funds are however insufficient to continue the level of MERS-CoV research needed and to meet this need for a more integrative research response. **We therefore call upon funding agencies, governmental bodies, and health policy makers concerned to invite MERC I to discuss the possibilities for providing financial support to enable initiation of much needed research to:**

- Establish the source of MERS-CoV;
- Establish knowledge of MERS-CoV molecular biology (including characterization of viral enzymes and MERS-CoV interplay with the host’s immune system);
- Determine the pathogenesis of MERS-CoV-associated disease in severe human cases;
- Establish the risk and risk promoting factors of human-to-human transmission of the virus;
- Establish true incidence of MERS-CoV infections and developing appropriate and sensitive diagnostic assays;
- Develop management plans for the prevention of MERS-CoV spread in Europe;
- (Further) develop prototype vaccines (e.g., vaccine candidate for MERS-CoV using synthetic biology and a reverse genetics system);
- Develop small molecule inhibitors of virus replication (as a first line of defence);
- Develop suitable animal models for use in the above studies.

¹ See annex I for the research groups assembled in MERC I

Annex I: MERS-CoV Initiative (MERCi) collaborating investigators

MERCi bundles the expertise from investigators from the existing EU FP7 consortia EMPERIE, ANTIGONE, PREDEMICS, SILVER and EVA and key other European scientists who have been at the forefront of European MERS-CoV research. Their expertise ranges from epidemiology and clinical/diagnostic virology via fundamental studies of coronavirus molecular biology to applying the acquired knowledge to vaccine design and antiviral drug development. Moreover, direct links are established between MERCi and operational frontline MERS diagnostic capabilities, which largely overlap with the existing influenza lab networks with established routes for dissemination of results. MERCi also harbours some key members of ISARIC (see www.isaric.org) and PREPARE (602525), the large scale EU FP7 funded clinical research consortium on emerging epidemics (starting 1 February 2014), providing access to large European and international primary care and hospital care clinical research expertise and networks. The table below lists the MERCi collaborators in alphabetical order.

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For more information on EMPERIE, ANTIGONE, PREDEMICS, SILVER or EVA please follow the links below.



www.emperie.eu



www.antigonefp7.eu



predemics.biomedtrain.eu



www.silver-europe.com



www.european-virus-archive.com