



Report of 2nd Sino-EU-PerMed S&T Webinar



Sino-EU PerMed has been funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement (GA) No 874556



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Summary:

This is the second report on in total 3 planned S&T Workshops. The 2nd Sino-EU PerMed S&T Workshop was held as an online webinar and focused on: Perspectives in Personalised Medicine: Developments in Cancer

The Sino-EU-PerMed Project

Personalised Medicine (PerMed) approaches bring along immense potentials to improve diagnosis and treatment of diseases and to development of prevention strategies by considering individuals' geno- and phenotypes, biomedical data, and lifestyle or environmental data.

“Widening Sino-EU policy and research cooperation in Personalised Medicine” (Sino-EU-PerMed) aims at connecting ICPeMed strategies and activities with relevant Chinese stakeholders. As part of the project an inventory mapping and analysis of the PerMed landscape in China has been performed and published. In addition, the Sino-EU-PerMed consortium will exchange expertise and experts via virtual workshops. Delegation trips in China and Europe is also planned if the Covid-19 pandemic allows. Thereby we will gain a better EU-Sino mutual understanding of PerMed activities and related cultural aspects. By running a series of targeted workshops Sino-EU-PerMed will promote international standards and pave the way for future communication, collaboration, and undertakings.

Our consortium aims at promoting the unique and long-term impact of personalised medicine approaches on society in cooperation and in alignment with ICPeMed. The cooperation with China will strengthen the international aspects and the planned activities in Sino-EU-PerMed will allow ICPeMed to further strengthen Europe's leading role in this area and contribute to a successful implementation of PerMed in the global context and foster joint PerMed projects between Europe and China.

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List of Abbreviations

Abbreviation	Explanation
AI	Artificial Intelligence (AI)
AR	Androgenrezeptor
cfDNA	circulating free DNA
EU	Europe
PM	Personalised Medicine
R&I	Research and Innovation
RNA	ribonucleic acid

Report on 2nd Sino-EU PerMed Science & Technology Webinar:

Perspectives in Personalised Medicine: Developments in Cancer

13th December 2022, 8:00 – 12:00 CET, 15:00 – 19:00 CST

A key part of the overall activities of the International Consortium of Personalised Medicine to align efforts in all areas of personalised medicine (PM), is to foster international coordination of research and innovation funding and policies.

To support these activities Sino-EU PerMed project, funded by the European Commission, undertakes several activities to promote interactions between China and EU within the area of personalised medicine. A key part of the project is to exchange expertise and PM knowledge via science and technology webinars, thereby promoting cooperation and networking activities.

This was the second of three planned science & technology webinars. The third one is planned to run as a hybrid event in context of the first Clover Leaf tour in April 2023.

Due to the Covid pandemic, travel between China and EU is not possible. The event was therefore held as a webinar. A total of 92 participants had registered their participation. The webinar was attended by ca 45 participants. Due to the fluctuation during the different sessions a total amount of no shows is difficult to estimate.

Examples from all key areas related to personalised medicine perspectives of cancer were presented at the webinar: basic research, genomics/proteomics, biomarkers, diagnostics, artificial intelligence, implementation in health care, and industrial perspectives. Within each area presentations from China and EU were given. In total 4 European and 6 Chinese scientists presented their work.

The official welcome was done by project coordinator Sabine Puch and WG4 lead Ejner Moltzen.

The key take-homes from the 10 presentations and the associated discussions can be summarized as follows:

It was demonstrated how RNA modifications can regulate immune responses thereby leading to specific targets (YTHDF1 and Mettl14) for cancer intervention. This was a good example how use of omics data can lead to new treatments.

Prostate cancer is an area of high need for better treatments. Aggressive forms of the disease have poor treatment outlook for the patients. Genetic research showed that AR gene amplification is very frequent in this disease. By using a protein degradation strategy three new targets in this pathway have been identified with potential as new treatment targets. These targets are currently being further explored.

The overall outcome of drug treatment of patients is surprisingly bad. On average only 50% of patients benefit from drug treatment and only 25% within cancer. There are several reasons for this poor outcome: limited number of biomarkers, poor analytical data which cannot be reproduced and other reasons. A key

problem concerns quality and standardization of genomic/proteomic data. An attempt to create standard reference materials to solve this issue was presented.

Knowledge of diagnostic molecular pathways is a prerequisite for successful personalised medicine. Extraction of the right info from the patient is key as is to pose the right questions. These can relate to mutation signatures, tumor mutational burden, microsatellite instability, homologous repair deficiency, etc. The EndoPredict tool has shown to be very useful in this regard. An intriguing technology is to create anticancer vaccines for the individual patient, based on samples from the patient himself.

One of the largest advances in cancer treatment in newer times is immune therapy. This technique is still in its infancy and a number of e.g. check point inhibitors have still not been addressed as potential treatment targets. The field is developing rapidly, and many studies are ongoing.

Testing for genetic predisposition for cancer is far from being used to its full potential for prevention and treatment of e.g. breast cancer. In UK more efforts are being put into avoiding testing than to test, although testing is not very costly. Better processes are needed. Determining polygenic risk scores might be another way forward to identify high risk populations, but the outcomes are not always clear, and caution must be exercised when interpreting the scores.

Evaluation of imaging results is time and resource demanding. Artificial Intelligence (AI) methods has been shown to be very useful to get better and quicker answers from imaging and the technology is developing rapidly. A new area is single cell scanning, where it is possible to determine the cellular origin of cancers. In addition, it is easy to get the large data amounts from the same patient that is needed to “train” the AI system.

Delivery of cancer drugs is often a problem, for example in pancreatic cancer. In addition, this cancer type is mostly detected late, thus resulting in a low survival rate (<9% 5-year survival). A key problem is delivery of drug to the pancreas. Availability can be greatly improved by using nano particle conglomerates of the drug due to the ability of nano particles to increase blood vessel leakiness. Various types of nano carriers are being developed.

BeiGene is a Chinese multinational pharmaceutical company with both a large pipeline of anticancer drugs and an impressive number of R&I projects covering a wide range of targets and techniques. The company is performing global clinical trials and related development of companion diagnostics.

Simcere Diagnostics is a Chinese company which develops multiomics approaches for early detection of cancers. They have a very interesting approach to identify and analyse cfDNA fragments from blood samples.

In conclusion, the presentations clearly showed that there are major activities within all aspects of cancer treatment and diagnostics, both in China and in Europe

Webinar Program

08:00 – 08:10 Welcome & Introduction

Sabine Puch (DLR, Coordinator)

Ejner Moltzen (Innovation Fund Denmark, WG4 Lead)

08:10 – 10:00 Developments in cancer

Han Dali (Professor, Beijing Institute of Genomics, CAS): **RNA m6A modification, a new regulator of anti-tumor immune response**

Michele Maio (Professor, University of Siena): **Title tbc**

Xu Yong (Principal Investigator, Guangzhou Institutes of Biomedicine and Health CAS):

Targeted protein degradation: new strategy for the treatment of prostate cancer

Leming Shi (Professor, School of Life Sciences, Fudan University): **Quality Control and Standardization of Multiomics for Precision Medicine**

Manfred Dietel (Senior Professor, Charité University Hospital, Berlin): **Diagnostic Molecular Pathology as Prerequisite for Precision Medicine**

10:00 - 10:15 Short Break

10:15 - 11:45 Developments in cancer

Clare Turnbull (Professor, Institute of Cancer Research, Royal Marsden NHS Foundation Trust, London): **Genetic risk prediction for cancer: opportunities and hyperbole**

Frederik Klauschen (Professor, Institutes of Pathology, Ludwig-Maximilians-Universität, Munich): **AI in cancer research and diagnostics**

Huan Meng (Professor, National Center for Nanoscience and Technology (NCNST), Beijing): **Use of nano-enabled approach for efficient treatment of gastrointestinal cancer**

Zhirong Shen (Vice President, Global Head of Translational Discovery, BeiGene):

Development of Innovative Precision Medicine with Global Efforts in BeiGene

Qing Xu (Executive Director, Simcere Diagnostics, Nanjing): **Multi-omics approaches to multi-cancer early detection (MCED)**

11:45 - 12:00 Concluding discussion & closure of webinar