



Deliverable 4.2

Report of 2nd and 3rd 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

Project Acronym	SINO-EU PerMed
Project Title	Widening Sino-EU policy and research cooperation in Personalised Medicine.
Grant Agreement no.	874556
Start date of the project	01/01/2020
End date of the project	31/06/2024
Name of the deliverable	Report of 2nd Sino-EU-PerMed S&T
Number of the deliverable	D4.2
Related WP number and name	WP4, Paving the S&T way to EU – China collaboration in PerMed
Related task number and name	WP4, TASK 4.2: 2nd Sino-EU PerMed S&T Workshop
Deliverable dissemination level	Public
Deliverable due date	30.04.2023(M40)
Deliverable submission date	30.05.2023
Deliverable submission date update	14.12.2023
Lead Beneficiary	Ejner Moltzen (Innofond)
Nature	Report on Webinar
DISCLAIMER	
<p>This document is provided with no warranties whatsoever, including any warranty of merchantability, non-infringement, fitness for any particular purpose, or any other warranty with respect to any information, result, proposal, specification, or sample contained or referred to herein. Any liability, including liability for infringement of any proprietary rights, regarding the use of this document or any information contained herein is disclaimed. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by or in connection with this document. This document is subject to change without notice. Sino-EU PerMed has been financed with support from the European Commission. This document reflects only the view of the author(s) and the European Commission cannot be held responsible for any use which may be made of the information contained herein.</p>	



Summary:

This is the report on the 2nd and 3rd S&T Workshop. 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 third workshop was organized as a hybrid event in Munich focusing on: Cancer aspects & links to Traditional Chinese Medicine

Keywords: Webinar, genomics, cancer, therapeutics, biomarkers, diagnostics, AI, TCM,

Revisions			
Version	Submission date	Comments	Author
Draft ver1	12.05.2023		Ejner Moltzen
Recommendations	24.05.2023		DLR
Final ver1	30.05.2023		DLR
Final	30.05.2023		DLR
Final ver 2	12.12.2023		Ejner Moltzen
Final2	12.12.2023		DLR

The Sino-EU-PerMed Project

Personalised Medicine 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 are 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. 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. Furthermore, to foster joint PerMed projects between Europe and China.

Table of Contents

The Sino-EU-PerMed Project.....	4
List of Abbreviations.....	6
Report on 2 nd Sino-EU Permed Science & Technology Webinar	7
Report on 3 rd Sino-EU Permed Science & Technology Workshop/Webinar	11

List of Abbreviations

Abbreviation	Explanation
AI	Artificial Intelligence (AI)
AR	Androgen Receptor
CAS	Chinese Academy of Sciences
cfDNA	circulating free DNA
EU	Europe
INSDC	International Nucleotide Sequence Database Collaboration
NGDC	National Genomics Data Center
PM	Personalised Medicine
R&I	Research and Innovation
RNA	ribonucleic acid
TCM	Traditional Chinese Medicine

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

Perspectives in Personalised Medicine: Developments in Cancer

13th December 2022, 8:00 – 12:00 CEST, 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.

The overall purpose and objectives of the webinars are as described in the project proposal: to establish common methodological approaches for joint Sino-EU science and technology research in PerMed, to promote collaboration in clinical trial methodology and in the setup of clinical cohorts for PerMed, to promote the implementation of approaches in PerMed compatible with an Equitable Health Care, and to enable the translation of research results to other world regions. Chinese as well as European aspects of these topics were presented and discussed at the workshops, thus enabling knowledge sharing as well as networking among presenters and participants.

The scope and programs of the workshops were developed in collaboration with our Science & Technology Expert Task Force (as outlined in the project proposal), which contains high level S&T experts from both China and Europe. The speakers were identified by several means:

- Suggested by our Expert Task Force Members
- Using the networks of Innovation Center Denmark in Shanghai
- Using networks of the project group

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 high fluctuation during different sessions a total amount of no shows is difficult to estimate. (Due to GDPR reasons, the participant lists have been moved from the deliverables, and were instead sent to the HaDEA, via the participant portal, on 07/12/2023.)

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.

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

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

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

It was presented 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 remains an area of high need for better treatments. Aggressive forms of the disease have poor treatment outlook for patients. Genetic research showed that androgen receptor (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 have a clinical benefit from drug treatment and only 25% within cancer. There are several reasons for this poor outcome, the most prominent being: limited number of biomarkers available and poor analytical data which cannot be reproduced and validated. A key issue also 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 the 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 have shown to be very useful to get better and quicker answers from imaging and 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 large amounts of data 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 at later stages, 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.

Report on 3rd Sino-EU PerMed Science & Technology Workshop/Webinar:

Perspectives in Personalised Medicine: Cancer aspects & links to Traditional Chinese Medicine

18th April 2023, 9:00 – 12:15 CEST, 16:00 – 19:15 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 third of three planned science & technology workshops/webinars. The workshop was held on 18 April 2023 as a hybrid event in context of the first Clover Leaf delegation tour on 16-22 April 2023 in Munich/Milan. The venue was very kindly provided by BioM Biotech Cluster in Munich.

The workshop was attended by 22 participants onsite and 42 online. (Due to GDPR reasons, the participant lists have been moved from the deliverables, and were instead sent to the HaDEA, via the participant portal, on 07/12/2023.)

Examples from key areas related to personalised medicine perspectives of cancer as well as links between PM and Traditional Chinese Medicine (TCM) were presented at the webinar: basic research, databases, genomics/proteomics, biomarkers, diagnostics, clinical, implementation in health care, and industrial perspectives. Within each area presentations from China and EU were given. In total 2 European and 5 Chinese scientists presented their work.

Webinar Program

09:00 – 09:10 Welcome & Introduction

Sabine Puch (DLR, Coordinator)

Ejner Moltzen (Innovation Fund Denmark, Chair ICPeMed)

09:10 – 10:30 Developments in PM: Cancer & data aspects

Yiming Bao (Director, National Genomics Data Center, Beijing Institute of Genomics):
China National Genomics Data Center Resources Supporting Cancer Research

Prof. Dr. Oliver Hayden (Technical University Munich / TranslaTUM Munich):
POCT for cancer

Pearl Pai (Chief of Clinical Services, Hong Kong University, Shenzhen Hospital):
Research opportunities at University of Hong Kong, Shenzhen Hospital

Marco J. Morelli (Head of Bioinformatics, Center for Omics Sciences, San Raffaele Hospital):

The 1+Million Genomes initiative: an infrastructure to access European genomic data

10:30 - 10:45 Short Break

10:45 - 12:00 PM links to Traditional Chinese Medicine

Yinxiong Li (Professor, Guangzhou Institutes of Biomedicine and Health):
Cancer treatment links to Traditional Chinese Medicine

Yang Ye (Professor, Shanghai Institute of Materia Medica, Shanghai):
TCM Personalized Medicine: from Traditional to Modern

Gary Deng (Professor, Memorial Sloan Kettering Cancer Center):
Personalized Approach in Traditional Chinese Medicine: Recent Findings

12:00 - 12:15 Concluding discussion & closure of webinar

The official welcome was done by Andreas Berghammer from BioM, project coordinator Sabine Puch (DLR), and WG4 lead Ejner Moltzen (Innofond).

The key take-homes from the 7 presentations and the associated discussions can be summarized as follows:

China is far in the process of developing an extensive network of collections of genetic data and biological samples for use in research and treatment of patients. The National Genomics Data Center (NGDC, <https://ngdc.cncb.ac.cn/?lang=en>) is a key player in that regard and provides many data resources for many areas. NGDC is also part of the International Nucleotide Sequence Database Collaboration (INSDC, <https://www.insdc.org/>).

Despite the large developments within PM, it was made clear that major efforts still are needed. This is reflected by the progress in cancer, where only 5-10% of all cancer patients receive a satisfactory treatment based on PM-approaches. There is a high need for more frequent and cost-effective diagnostics. The most optimal way forward is effective prevention, but this is currently difficult due to lack of diagnostic tools. Another key factor concerns the cost of new approaches. New health economic models are needed as well as development of effective companion diagnostics. Thus, there is a high need for continued development of technologies to support PM.

The progress in China regarding providing better – and PM-based – treatment for patients in China is reflected by the large investments in hospitals. A good example is the University of Hong Kong - Shenzhen hospital (<http://www.hku-szh.org/en/>). Although the hospital is rather new (opened in 2012) it is currently expanding its 2000 hospital beds to 3000. The hospital is not only providing state-of-the-art treatments to its patients, but is also engaged in numerous research activities, both nationally and internationally. The hospital is also combining TCM with modern approaches.

Sharing of genetic data for use in research and treatment continues to be major challenge, particularly

when it comes to sharing across borders. The 1+Million Genomes/Beyond 1+Million Genomes initiatives have over the last years made a major effort to solve the multitude of problems related to sharing of data and has made major progress. The progress relates both to proposing solutions to the legal/ethical issues related to data sharing, but also to technological issues that need to be addressed, e.g., relating to data formats. The project is now entering its second phase, where focus will be on national implementations.

There is high focus on cancer research in China and many groups perform state-of-the-art research to find better treatment. A good example is stem cell approaches to treat liver failures. Good results have been achieved in mouse models of injecting stem cells. There is a very large potential in this type of treatment since it might (partially) replace liver transplantation, where very large bottlenecks exist. Alone in China 300.000 patients are waiting for a new liver.

TCM has been existing for centuries and is still a main treatment approach in China. However, TCM has now entered into the era of modern medicine, and it has become clear that TCM can be linked to PM and that there are very interesting future perspectives, as seen from several angles:

- There is intensive research ongoing in China to isolate and characterize the active components of the natural products treatment, that has been a mainstay of TCM for centuries. This research has already led to several new drug approvals. However, the research also shows that the field is complex: often the therapeutic effect of a natural product cannot be linked to a single active compound but is due to the effect of a family of related compounds. This of course complicates the process of turning a natural product treatment into a more effective modern therapeutic drug.
- Modern treatments of cancer often have severe side effects which affects the patient's quality of life significantly in a negative manner. Treatment of these side effects with TCM-based approaches (e.g., acupuncture) has now been shown to be surprisingly effective in improving the quality of life of these patients.
- An essential part of TCM consists of a very detailed phenotyping of symptom patterns of the patients. This phenotyping then provides the basis for decisions regarding which natural products to prescribe. A number of recent research efforts are ongoing to link this phenotyping to genetic patterns of the patients and also to establish pharmacogenomic links to the effects of the natural products. Very interesting results have already been achieved and there is no doubt that there is high potential in further developing this link between TCM and PM (see e.g., <http://www.symmap.org/>,

In conclusion, the presentations clearly showed that there are major activities within PM, both in China and in Europe, and presented links between PM and TCM provide a very interesting and promising path forward for further development of PM.



Cooperation between China and Europe
in Personalised Medicine



Sino-EU PerMed received funding from the European Union's Horizon 2020 research and innovation programme, grant 874556