ICR The Institute of Cancer Research

Industry collaboration opportunity

A predictive test for personalising treatment of advanced sarcoma with a multi-target kinase inhibitor

The Institute of Cancer Research, London, is seeking partners to continue the development of a gene expression signature for predicting tumour response to the multi-target tyrosine kinase inhibitor (mTKI) pazopanib, and related drugs in the same class – supporting the transition of this biomarker test to the clinic to achieve maximum patient benefit.

A patent application has been filed (WO2019030379A1 – 'Materials and Methods for Stratifying and Treating Cancers'), which is due to go to grant in EP and in prosecution in the USA and Japan.

The ICR team is now planning to evaluate the clinical utility of this multi-gene biomarker test for personalising treatment for sarcoma in a prospective clinical trial.

About the programme

Recent advances in the understanding of the genetic changes driving cancers have uncovered the crucial role of protein kinases in tumour development and spread. As a result, these enzymes have become attractive targets for the treatment of several different cancer types.

The first protein kinase inhibitor to receive approval was imatinib, which has shown remarkable effectiveness for patients with chronic myeloid leukaemia. Since then, a total of 89 drugs targeting protein kinases – including both single and mTKIs – have been approved by the US Food and Drug Administration (FDA). Early diagnosis of the genomic alterations driving a patient's cancer is crucial for selecting the most beneficial treatment option – providing the best chance of successful outcomes while minimising the risk of side effects.

Pazopanib is an mTKI that has been approved as an effective treatment for patients with advanced soft tissue sarcoma, a type of cancer that develops in the connective and supporting tissues of the body. But there is currently no predictive test to identify patients whose tumours are most likely to respond to this targeted drug.

Researchers at the ICR have now identified a novel gene expression signature – **K**inase inhibitor **A**ctivity and **R**esponse in **SARC**oma (KARSARC) that can help identify sarcoma patients who are most likely to derive the greatest benefit from pazopanib treatment.

Key publications

1. Huang, P. et al. A molecular signature predictive of clinical outcome following pazopanib therapy in advanced soft tissue sarcoma. Ann. Oncol. 28, x149-x152 (2017).

2. Patent reference WO2019030379A1 – 'Materials and Methods for Stratifying and Treating Cancers'.

Key points

- KARSARC, which comprises 225 genes, can stratify patients through the profiling of both primary or metastatic tumour diagnostic samples irrespective of intervening treatment – without the need for additional invasive tumour biopsies.
- The test is fully compatible with a range of different tissue types, including Formalin-Fixed Paraffin-Embedded (FFPE) and frozen samples, enabling its rapid clinical application.
- KARSARC has been validated in multiple independent cohorts of sarcoma patients. It can identify a subgroup of patients who are exceptional responders to pazopanib (with a typical ~13 months progression-free survival benefit compared to ~4-6 months).
- This is the first validated biomarker assay capable of successfully identifying tumour responsiveness to pazopanib, offering the potential to help guide clinical decision-making for sarcoma patients.

Industry collaboration at the ICR

The ICR has more than 100 current industrial partners and is consistently one of the top-ranked UK higher education institutions (HEIs) at collaboration with industry.

It was the top-rated HEI in biological sciences, and second overall for research quality, in the influential REF2021 assessment by the UK government. It has discovered 21 clinical drug candidates since 2005 and progressed 12 into clinical trials.

Lead scientists/inventors

Dr Paul Huang is the Leader of the Molecular and Systems Oncology Team at the ICR. His laboratory focuses on understanding aberrant signalling networks and drug resistance in sarcomas and lung cancer, to develop biomarkers and new therapies for these diseases.

Dr Maggie Cheang is the leader of the integrative genomics analysis team at the ICR. She focuses on identifying and developing multi-parametric molecular classifiers to predict sensitivity of each tumour type to therapeutic agents in phase II and III clinical trials. She co-invented the 50 genes-based classifier for the intrinsic subtypes of breast cancer, commonly known as PAM50, which is currently licensed by Veracyte as Prosigna and has been implemented into multiple international clinical practice guidelines. She also chairs the UK National Cancer Research Institute (NCRI) Clinical Trial Pathology Advisory Group.

Professor Robin Jones is Team Leader in Sarcoma Clinical Trials at The Institute of Cancer Research and Consultant Medical Oncologist at the ICR's partner hospital The Royal Marsden NHS Foundation Trust. He is a specialist in the treatment of bone and soft tissue sarcomas, and focuses on developing novel therapies for these diseases.

Our Business and Innovation Office

The ICR's interactions with industry partners are led by our Business and Innovation Office, a UK-leading technology transfer office that oversees a large portfolio of partnership and licensing opportunities across a range of oncology research.

Contact the Business and Innovation Office for more information on our licensing and partnering opportunities.

Read more about our commercialisation work and sign up for our industry email newsletter at icr.ac.uk/partnerships

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