THE ROLE OF BIOMARKERS IN PERSONALISED HEALTHCARE

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Bob has over 15 years' experience in the biomarker and companion diagnostic industry working for both diagnostic and pharmaceutical companies. Bob joined BerGenBio in 2017 and is responsible for all aspects of biomarker discovery and companion diagnostic development across the BerGenBio clinical pipeline. Prior to moving to BerGenBio Bob spent over 10 years working in biomarker and diagnostic contract research at both Almac and Hologic providing biomarker discovery and companion diagnostic development services to pharmaceutical companies. Bob has considerable experience of diagnostic product development, from early biomarker discovery through to the development of commercially available, approved diagnostic products. Bob has an undergraduate degree from the University of Dundee and a PhD from the University of Liverpool. Additionally, he has authored several key biomarker publications in peer-reviewed journals, book chapters and is an inventor on a number of biomarker patents.

What are your views on the role that biomarkers will play in the future of healthcare?

Biomarkers have played a key role in healthcare for centuries, even simple things we take for granted like having your temperature and blood pressure taken are in fact biomarker based tests. In recent years our understanding of disease biology, the mechanism of action of drugs and our access to immensely powerful technologies such as next generation sequencing has fundamentally altered medical practice. The use of companion diagnostic (CDx) tests now allows treatment decisions to be made based on the results of complex biomarker tests allowing patients to receive a treatment that is right for them.

How important is biomarker discovery in the development of a companion diagnostic test?

The discovery and validation of a predictive biomarker is a pivotal step in the development of any companion diagnostic - without a biomarker there is no test. In addition there are two major stakeholders in the CDx development process with very different roles to play; the pharmaceutical company developing the drug and the diagnostic company developing the biomarker based test.

Biomarker discovery is a key activity for the pharmaceutical company particularly during preclinical and early stage clinical studies. At this stage it's critical for the pharma company to keep one eye on the future of the biomarker and ask, "what will this look like in the clinic"? This is particularly important when it comes to platform and chemistry choice, for example if there is a choice between two candidate biomarkers, one of which is a new technology that only works on a fresh frozen biopsy and another which is based on a standard blood based assay the sensible decision would be to choose the blood based biomarker to develop into a CDx.

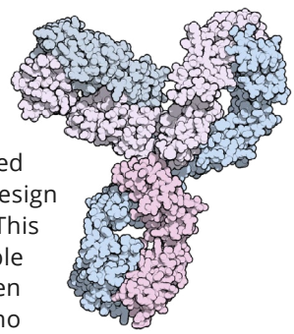
To take a biomarker and turn it into a regulatory approved, commercially available diagnostic product requires capabilities that the majority of pharma companies don't have so it will be necessary to partner with a diagnostic company. From the diagnostic company's standpoint biomarker discovery forms a very small part of the product development process. Key activities for the diagnostic company in the development of a CDx include regulatory interactions, design control, manufacturing and reimbursement all of which will require continuous input from the pharma company throughout the product development process.

In your opinion what have been the most important developments in personalised medicine over the last 12 months?

For me the standout development of last year was the U.S. Food and Drug Administration's approval for treatment of cancers with a specific biomarker using pembrolizumab regardless of disease indication. This is the first time the agency has approved a cancer treatment based on a common biomarker rather than the location in the body where the tumour originated and represents a paradigm shift in the way cancer can now be treated. Historically drugs were approved for specific disease indications, e.g. breast cancer, this latest approval allows patients with any cancer with microsatellite instability-high (MSI-H) or mismatch repair deficient (dMMR) to be treated with pembrolizumab.

What are the biggest challenges in integrating a personalised medicine program into a drug development pipeline?

Without a doubt the biggest challenge is the timelines involved, it's critical to identify a predictive biomarker as early as possible in the drug development process, ideally during pre-clinical studies. The nature of Phase I and Phase II trials means they are often of limited use when it comes to biomarker discovery primarily due to sample numbers and the availability of tissue samples. The next hurdle is the transition from Phase II to Phase III studies, at this time a locked down predictive biomarker is required together with a suitable Phase III trial design and a diagnostic partnership in place. This represents an almost insurmountable hurdle, something which has now been recognised by regulatory authorities who acknowledge the need for retrospective biomarker/CDx studies.



pembrolizumab
(artist's impression)