Two halves equal a whole: the opportunities in translating research

Elisa Mokany and Alison Todd*

4 Cornwallis St, Eveleigh, NSW, Australia

SpeeDx Pty Ltd
Eveleigh, NSW, Australia
elisam@speedx.com.au

The medical device field today demands technologies to continuously evolve, becoming better, faster and more cost efficient, whilst still being accessible to the developing and developed worlds. The ongoing pressure on cutting edge research to answer this call, within the context of limited resources and funding, drives the ingenuity behind the translational research in Australia and specifically at SpeeDx.

SpeeDx, invents, develops licences and translates its proprietary technology into products for the detection of diseases and disease-causing pathogens. SpeeDx aims to place the value of diagnostics firmly into best-practice patient management, developing tests that have a true positive impact on human health and clear value to the greater health network.

Our foundational technology, which we call *PlexZymes*, are novel, highly innovative & reliable "sensing" enzymes.[1] The PlexZyme is composed of two DNA oligos that bind adjacently on a target nucleic acid sequence, to form an active enzyme that cuts a reporter oligo bound to the PlexZyme complex. These are cheap and fast to manufacture and can be designed to sense any disease marker. The advantages of the PlexZyme became evident when utilised in real-time PCR, especially when multiple targets are required to be amplified and detected in a single reaction. Early research demonstrated that up to 25 different genetic assays could be combined, without sacrificing the specificity or sensitivity of the reaction.[2]

The process of employing PlexZymes for in vitro diagnostic (IVD) tests, was straight forward on the research side; however, the complexity of the capacity required to take it from the research lab to the pathology lab required additional expertise and the expansion of SpeeDx, made possible only through private and government funding.

SpeeDx now successfully manufacture and sell IVD tests for infectious diseases around the world, with a focus on antimicrobial resistance. This novel approach to diagnostics, combining additional information beyond the simple detection of disease-causing agent, is influencing patient management guidelines[3-5] and catalysing further commercial collaborations, expanding access to a wider patient audience.[6] True to SpeeDx ethos, we continue to innovate, aiming to further improve IVD technology so that, if we are to be superseded, it will be by us.

1. Mokany E., Bone S.M., Young P.E., Doan T.M., Todd A.V., 2010. MNAzymes are a versatile new class of nucleic acid enzymes which can function as biosensors and molecular switches. J. Am. Chem. Soc. 132(3); 1051-1059

2. Tan L. Y., Walker S. M., Lonergan T., Lima N. E., Todd A. V. Mokany E. 2017. Superior Multiplexing Capacity of PlexPrimers Enables Sensitive and Specific Detection of SNPs and Cluster Mutations in qPCR. PLOS One January 23rd.
3. Jensen JS, Cusini M, Gomberg M, Moi H. 2016. 2016 European guideline on Mycoplasma genitalium infections. J Eur Acad Dermatol Venereol. PMID: 27505296.
4. https://www.bashhguidelines.org/media/1146/ngu-update-05_2017-final.pdf
5. http://www.sti.guidelines.org.au/sexually-transmissible-infections/mycoplasma-genitalium
6. https://www.businesswire.com/news/home/20190905006074/en/SpeeDx-Receives-CE-IVD-Clearance-ResistancePlus-MG-FleXible