

# Sequencing to Inform Cancer Treatment

Dr. Andrew Fellowes, Department of Pathology at the Peter MacCallum Cancer Centre, uses TruSeq® Custom Amplicon and the MiSeq® personal sequencer to revolutionize tumor classification, making a dramatic impact on how cancer treatment decisions are made.

Andrew Fellowes, Ph.D., FHGSA, FFSc (RCPA) is Scientist in Charge, Molecular Pathology Diagnostic Development in the Department of Pathology at the Peter MacCallum Cancer Centre in Melbourne, Australia. Peter Mac is Australia's only public hospital solely dedicated to cancer and home to Australia's largest cancer research group. Peter Mac's vision is to provide the best in cancer care, accelerating discovery translating to cures. Working toward this vision, Dr. Fellowes is developing tumor profiling tests using Illumina next-generation sequencing technology. Peter Mac's next-generation sequencing program is funded by Therapeutic Innovation Australia through the Australian Government's Super Science Initiative as financed from the Education Investment Fund.

**Q: What is the focus of your lab?**

**Andrew Fellowes (AF):** As a National Association of Testing Authorities, Australia (NATA)-accredited clinical diagnostic laboratory, we provide pathology reports for clinicians at Peter Mac and other hospitals for use in making patient treatment decisions. We are also interested in novel testing technologies and platforms for developing and transferring tests to the clinic. Turnaround time for these tests is critical. Speed can be of the essence when treating cancer, so this is especially important for our big research study, Cancer 2015.

**Q: What is Cancer 2015?**

**AF:** Cancer 2015 is a large-scale longitudinal study in Australia. It involves collecting samples from 10,000 cancer patients, and will test the hypothesis that classifying tumors by their molecular profile can provide a better model of cancer diagnosis and treatment than traditional pathology. As a cohort study, it also collects epidemiological data and follows patient outcomes and subsequent quality of life. It may change the paradigm of traditional tumor classification and treatment to one based on a molecular profile.

*“MiSeq and TruSeq Custom Amplicon introduce huge advantages in simplifying and streamlining the workflow, enabling us to deliver results within a clinically relevant time frame.”*



Dr. Andrew Fellowes develops molecular profiling assays using next-generation sequencing technology and provides clinical diagnostics services at Peter Mac in Melbourne, Australia.

**Q: What methods were considered for Cancer 2015?**

**AF:** When Cancer 2015 was first being designed, it was envisioned that we would run the Sequenom OncoCarta assay on these clinical study samples. OncoCarta has been a very successful research tool. But, thanks to great efforts of Illumina and those of us here at Peter Mac, we were instead able to bring a next-generation sequencing assay into the equation in time for the beginning of Cancer 2015.

**Q: Why is the TruSeq Custom Amplicon assay on the MiSeq system a good approach for Cancer 2015?**

**AF:** In cancer diagnostics, we generally sequence whole genes or whole parts of genes to look for any change, not just a specific change in those regions. A screening or a sequencing approach is the most popular paradigm for these sort of tests at the moment. For Cancer 2015 we needed to adopt a molecular profile assay that was easy to perform with a fast turnaround time, comprehensive in terms of covering all clinically relevant targets that predict success of a particular drug or prognosis, and useful for monitoring. We're only just beginning to develop these assays. With TruSeq Custom Amplicon we'll be able to profile tumor samples for a wider range of mutations and with greater speed and sensitivity than is possible with our current technology.

