Editorial

Preface—molecular genetics of lung cancer

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The molecular genetic alterations underpinning lung cancer have been of great interest to researchers for many years. The discovery of small molecule inhibitors that target some of the key driver genetic alterations of lung cancer has fuelled this interest and catapulted genetic testing of tumours for somatic mutations into routine clinical practice. Successful and rapid translational lung cancer research has enabled patients of today to clinically benefit from these recent advances. It is therefore most fitting to dedicate a special issue on molecular genetics of lung cancer in *Translational Lung Cancer Research* (*TLCR*). In this issue, we bring together a range of original articles and reviews that summarise current clinical practice of molecular testing in lung cancer and preview exciting developments that may impact patient care in the future.

There is a challenge to provide accurate, comprehensive and cost effective molecular characterisation of each patient's tumour to guide optimal patient care. As more targeted therapies progress through the pipeline an increasing array of potential targets are being discovered and translational research will be required to determine the optimal approach to identify relevant targets. While molecular testing of lung adenocarcinomas for *EGFR* mutations is now standard practice, the practicalities and challenges of dealing with often minute tumour samples continues to be a challenge for molecular pathology laboratories. A greater understanding of the utility of different specimen types as well as the strengths and limitations of different mutation testing assays is an important consideration for all those involved in lung cancer management. In this special issue, an original article investigates the impact of specimen type on mutation testing for *EGFR* and other mutations in lung cancer. Review articles provide comprehensive reviews of different methods for mutation testing in lung cancer including those in current practice as well as next generation techniques at the cutting edge of technology.

Targetable driver oncogenes resulting from chromosomal translocations provide additional challenges resulting from their relative rarity and the need for different approaches to identify them. Research over the past 7 years has led to our current depth of knowledge about *ALK* rearranged lung cancers as well as diagnostic techniques to identify such genetic alterations. In addition to *ROS1* and *RET*, more recently a number of additional novel translocations have been identified in lung cancer such as those involving *NTRK1*, *NRG1* and *FGFR1/2/3*, providing exciting opportunities for therapeutic intervention that are also covered in this special issue.

In addition, the new frontier of immunotherapy in lung cancer treatment has arisen from insights into the complex molecular mechanisms of tumour immune evasion. The genetic makeup of tumours that determine immune resistance, and the interaction of a tumour with an individual host's immunity are likely important determinants of disease progression as well as susceptibility to immunotherapy. More recent research focus on the role of immune evasion in lung cancer is a timely reminder that a greater understanding of the molecular biology of all lung cancers, and not just those harbouring individual driver mutations will lead to greater advances for lung cancer patients in the future.

We hope you will find our special issue on molecular genetics of lung cancer in *TLCR* both informative and stimulating as we endeavour to expand our understanding of lung cancer and ultimately improve patient outcomes.

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