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Role of immunohistochemistry and biobanking in targeted cancer therapy

Beena Kumar
Monash Health, Australia

Chemotherapy which has been the standard therapeutic regimen for cancer has the disadvantages of conforming to the “one size fits all” style which is outdated in the current times. Also these standard drugs fail to distinguish malignant versus normal tissue, thus bringing along a range of adverse effects. Targeted treatment on the contrary shows a greater selectivity for tumor cells and causes less damage to normal cells. It is to be noted that morphologically distinct tumours show variable biological characteristics and response to treatment. It is thus becoming important to identify these targets within the cancer tissue which include the tumour cells and the tumour microenvironment (i.e., stromal cells, micro vessels, and host's immune cells), all of which could serve as potential treatment targets. Targets of tailored treatment are proteins involved in the cell-signalling pathway, cell cycle, apoptosis, and angiogenesis. Recent examples are detection of HER2 gene over-expression in breast and gastric cancers, mutations in several genes, i.e. EGFR for lung cancer, KRAS gene in lung and colo-rectal cancers, KIT gene in gastro-intestinal stromal tumor (GIST), detection of activated transduction signals for renal cell carcinoma and neuroendocrine tumors, hormone receptors in neuroendocrine tumors. The agents used for this mode of treatment could include monoclonal antibodies, tyrosine kinase inhibitors, signal transduction inhibitors and hormonal analogues. Most of these biomarkers were earlier detected by molecular techniques. These tests are expensive and not easily accessible. Immunohistochemistry is an excellent surrogate to identify the proteins/targets in question. Though widely used, this technique comes with its share of challenges which could be at the pre-analytical, analytical and post analytical levels. It is highly mandatory to establish robust methodologies within the laboratory to obtain the right answer, which would ultimately benefit patient management/response to treatment. The role of a tumour biobank has its added value in collecting and storing valuable tumour material for standardisation of techniques. The biobank could be utilised to play a pivotal role in important clinical trials which are vital for evaluation of drugs in various cancers.

Beena.Kumar@monashhealth.org