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Setting up a methodology for the study of ALK translations by liquid biopsy

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Cancer is a generic term for a large group of diseases characterized by the growth of abnormal cells that can then invade and spread to other organs. Lung cancer is one of the most common types. It is also the one with the highest mortality rate in Spain and in the rest of the world. There are two main types of lung cancer: Small-Cell Lung Carcinoma (SCLC) and Non-Small-Cell Lung Carcinoma (NSCLC). The discoveries of Tyrosin Kinase Inhibitors (TKI) that target Anaplastic Lymphoma Kinase (ALK) gene rearrangements have achieved a huge success in the management of patients with ALK-positive NSCLC. The principal TKI for these patients is called Crizotinib. It induces rapid tumor regression and objective responses in the majority of patients whose tumors contain the ALK gene rearrangements. Although a great advance in the treatment of these patients has been achieved, the initial diagnosis remains a challenge since it is confirmed by a tissue biopsy which requires an invasive procedure. Liquid biopsy testing is a new, non-invasive technique, suitable to identify NSCLC patients that can benefit from ALK-targeted therapies. This technology allows the detection of nucleic acids in plasma or serum thanks to the improvement in the Polymerase Chain Reaction (PCR), the digital-PCR. Tumors release fragments of DNA into the bloodstream that can be used to monitor the drug response, allowing much more personalized treatments. This type of genetic material is known as circulating tumor DNA (ctDNA). In addition to ctDNA, exosomal RNA, Circulating Tumor Cells (CTCs) or platelet RNA offer the potential for drug response detection and monitoring by liquid biopsy. The objective of the research is to focus on liquid biopsy using a specific blood component, known as Tumor-educated Blood Platelets (TEPs) and how it can help to detect ALK gene translocations.

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