Mathematic in every aspect of Molecular Diagnostics in Clinical Oncology

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A laboratory medicine is a laboratory where clinical pathology tests are carried out on clinical specimens to obtain information about the health of a patient. Molecular diagnostics is a part of laboratory medicine, which relies on the detection of individual DNA/RNA features. There are two avenues where molecular tests have become a part of standard management of patients with cancer. First, they are useful to identify subjects with hereditary cancers. Second, they can help to select the most effective treatment based on molecular characteristics of tumor tissues or some other biologic parameters of malignant disease. In this presentation, I am going to developed different techniques and tools that are currently used in daily practice for molecular characterization of tumor or for cancer predisposition. Namely, I will introduce one of the techniques used for circulating tumor DNA detection. Then I will tell about Next Generation Sequencing for the detection of single molecular alterations or microsatellite copy number detection. Finally I will show that mathematics are necessary in every probabilistic tools used for molecular interpretation. Indeed, many aspects of these techniques/tools require mathematic to generate workable data or to interpret those data.