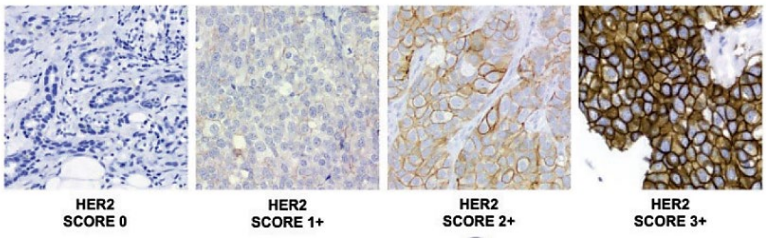
GENOMIC TESTING

Immunohistochemistry (IHC): Uses antibodies linked to dye to detect markers (antigens). Tissue is treated with florescent antibodies that bind with the antigen. The presence and distribution of the specific antigen can then be identified by examining the stained tissue.

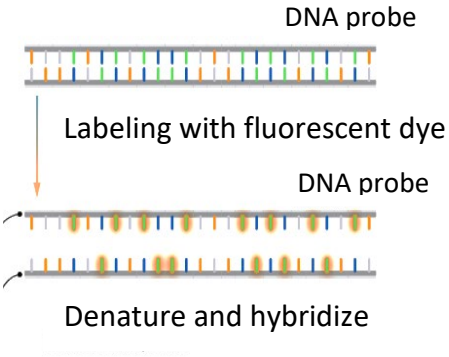
Results are reported as +1, +2, +3. If > 50% are +3, it is considered a positive test. *Example HER2*.



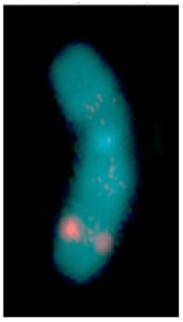
Fluorescence insitu hybridization (FISH): Detects and locates a specific DNA sequence on a chromosome. The technique exposes chromosomes to a small DNA sequence called a probe with a fluorescent molecule attached. The probe sequence binds to its corresponding sequence on the chromosome. It completes a single gene map, allowing visualization of amplification of gene alterations.

Results are either detected (+) or not detected (-) *Example:* BCR-ABL: Positive. If the test was performed on nuclei, the result would be reported with an ISCN description or nuc ish.

Example: *nuc ish* 3q27(BCL6X2)[200]

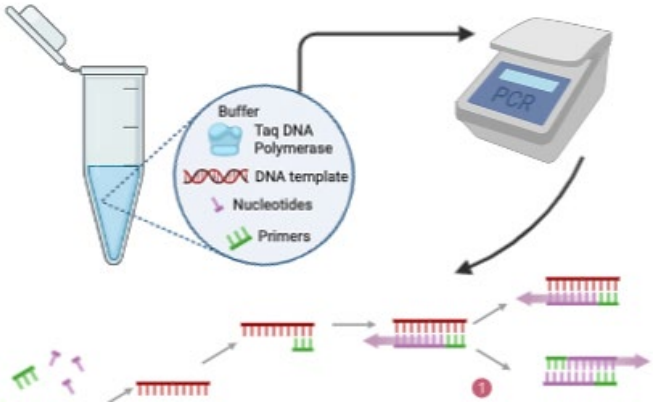


View using microscope



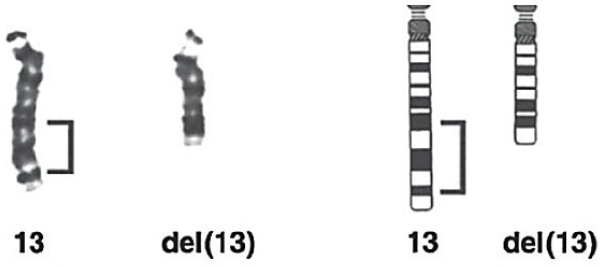
Polymerase Chain Reaction (PCR): This test amplifies small segments of DNA, creating millions of copies of a specific DNA sequence. PCR uses short synthetic DNA fragments called primers to select a segment of the genome to be amplified, and then multiple rounds of DNA synthesis to amplify that segment. *Example:* Microsatellite instability (MSI)

Results are positive (detected), Negative (not detected) or inconclusive or indeterminate. MSI may be reported as high, stable or low.



Karyotype: A laboratory technique that produces an image of an individual's chromosomes. The image is used to look for abnormal numbers or structures of chromosomes.

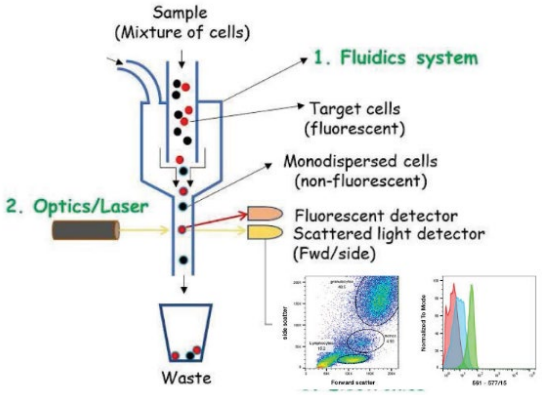
Results will look like a long string of numbers and letters that are specific to the genetic change that was identified. *Example*: 46XY,del(17)(p13.1) Deletion of TP53



GENOMIC TESTING

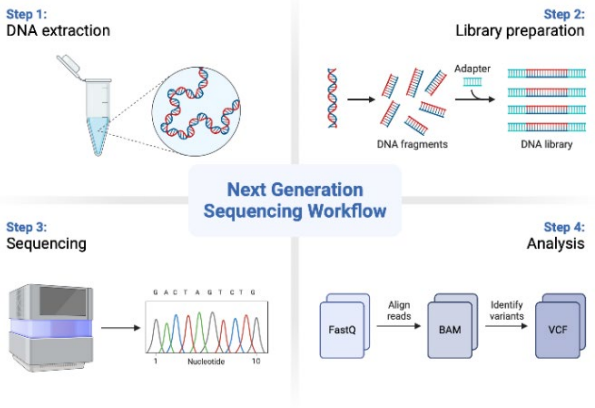
Flow Cytometry: This measures the number and characteristics of cells in a sample of blood, bone marrow or other tissue. Tumor markers on the cell surface are also measured. The cells are stained with a light sensitive dye, placed in a fluid and then passed one at a time through a beam of light. The results are based on how the stained cells react to the beam of light.

Results are reported as positive or negative, usually with the % of cells with the specific marker. *Examples*: CD20, receptors (e.g. VGFR), cytokines (e.g. IL2 and IFN)



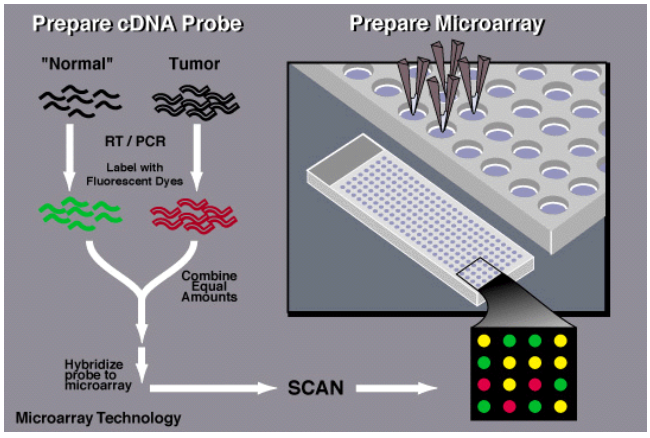
Next Generation Sequencing (NGS:) A method used to determine a portion of the nucleotide sequence of an individual's genome. Using DNA sequencing technology, it can process multiple DNA sequences simultaneously, allowing detection of multiple variants across targeted areas of the genome.

Results are generally reported as variants and what treatments are recommended. *Example*: EGFR, amplification; T790M. There are also variants of uncertain significance, meaning there is no current evidence for their therapeutic, prognostic or diagnostic utility.



Microarray: Chromosomal microarray analysis (CMA) is used to detect genetic variations across the genome. A sample of DNA is obtained from tissue, blood or saliva as well as a control sample. The DNA is fragmented into smaller pieces. The patient's DNA is labeled with green dye and the control with red. These fragments are then attached to a microarray chip and allowed to bind. If there is no mutation, both the red and green samples bind to the sequences on the chip that represent the normal. If the mutation is present, the DNA will bind to the sequence on the chip that represents the mutated DNA.

Results indicate if a gene is over or under expressed, which can indicate a mutation. *Example: ATM & TP53*



Chromosome Region	Cytoband	Event
chr11:98,901,957-117,228,848	11q22.1 - q23.3	CN Loss
chr17:1-22,062,044	17p13.3 - p11.2	CN Loss