HDHCT 22

ADVANTAGES AND DISADVANTAGES OF DIFFERENT SPECIMENS

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INTRODUCTION

Molecular pathology analyses are a very important part of diagnostic procedure in pathology today that can provide prognostic information and can also be helpful with treatment approach.

Different specimen types are used for analyses of changes that occur in the nucleic acids. Majority of samples are formalin-fixed paraffin-embedded tissues (FFPET), followed by cytological samples, peripheral blood, bone marrow as well as fresh tissues stabilized in RNAlater solution.

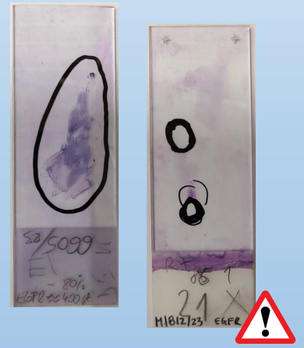
Each specimen type has advantages and disadvantages, which also depend on the method we plan to use for analysis.

FFPET

Advantages:
- Good differentiation between tumor and non-tumor cells
- Versatile usage (FISH, PCR, sequencing…)
- Sample adequate for analysis even after several years
- Most of the commercial tests are validated for FFPET specimens

Disadvantages:
- Fixative-induced degradation of nucleic acids
- Fixative-induced changes[1]
- Invasive sampling
- Limited informations on overal tumor's genetic landscape due to the tumor heterogenity

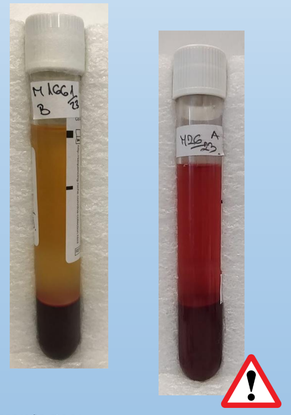
CITOLOGY



Advantages:
- Good differentiation between tumor and non-tumor cells
- Good quality of extracted nucleic acids
- Sample adequate for analysis even after some time

Disadvantages:
- Not easily applicable in all molecular methods
- Most of the commercial tests are not validated for cytology speciments (in-house validation required)[2,3]
- Invasive sampling
- Limited informations on overal tumor's genetic landscape due to the tumor heterogenity

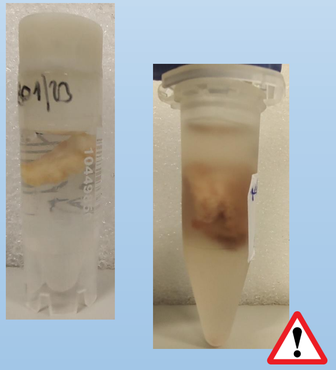
LIQUID BIOPSY



Advantages:
- Non-invasive sampling
- Very informative (tumor evolution, subclones, therapy response…)[4,5]
- Increasing number of commercial tests validated for LB specimens

Disadvantages:
- Not easily applicable in all molecular methods
- Needs urgent sample processing (plasma separation)
- Sensitivity of the method used for analysis has to be very high (risk of false negative results)

FRESH TISSUE



Advantages:
- High quality of extracted nucleic acids
- If properly processed and stored, adequate for analysis even after some time[6]

Disadvantages:
- Not easily applicable in all molecular methods
- Difficult assessment of distribution and proportion of tumor cells
- Invasive sampling
- Limited informations on overal tumor's genetic landscape due to the tumor heterogenity

CONCLUSIONS

While working with different specimens, it is very important to know the propositions and limitations of the method and test used for analysis.

Universally, good quality material is required for successful analysis. Some of the most significant propositions are good sampling and preanalytics with sufficient quantity of material and adequate tumor content in analyzed sample.

Only a responsible approach to every step of specimen processing and molecular testing, with good laboratory practice procedures followed, results in reliable analysis reports which are extremely important for the treatment of oncology patients[7].

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