IVD.18 - Identification of aptamers for application in the differential diagnosis of ovarian tumor

Rayane da Silva Abreu1*; Aline Moreira1; Fábio Passet2; Claudia Bessa3; Wim Degrave1; Mariana Caldas Waghabi1.
1Fiocruz/IOC;
2Fiocruz - Paraná;
3INCa.

Introduction: Cancer is an important cause of worldwide mortality, killing more than 8 million people every year. The ovarian cancer is one of seven cancer types than most affect women, and is considered the most fatal among the gynecologic tumors. The ovarian tumor detection presents important limitations and is highlighted as the most difficult gynecological tumor to be diagnosed, hidering the efficiency of the treatment and consequently patients’ survival. Specific molecules produced by tumors could be used as biomarkers and are considered good targets for diagnosis. Thus, the use of aptamers represents an important tool to be applied for the improvement of the specificity in tumor diagnosis. Aptamers are small synthetic nucleic acid sequences, which bind with high specificity to a molecular target, presenting interesting pharmacokinetic stability, bioavailability and permanence in blood circulation, and moreover are able to bioconjugation with nanoparticles, imaging agents and therapeutic drugs. Bioinformatics approaches may contribute to the improvement of aptamer identification and studies focusing in target molecule-aptamer interaction. Thus, computational analyzes are being applied to aptamers study, including 3D structural modeling, in silico simulation for aptamers selection by molecular dynamics, modeling of virtual libraries and in silico aptamer optimization.

Objective: The main goal of this study is the identification of aptamers with potential use in tumor-specific diagnosis that would be able to differentiate metastatic and non-metastatic tumor with application in tissue biopsies for epithelial ovarian cancer.

Methodology: For this, the Cell-Selex methodology will be applied for the selection of specific for each ovarian tumor type: metastatic and non-metastatic. The identification of the molecules recognized by selected aptamers will be developed by AptaBios proteomics. Further, the 3D aptamers structures and the target molecules will be modeled and the interaction of the aptamer with its target molecule will be analyzed in silico through molecular focusing.

Results: To date, we are doing the round 7 of Cell-Selex for the selection of specific aptamers for non-metastatic cell, using caov-3 cell line, of epithelial ovarian tumor.

Conclusion: Although the use of this methodology had been already explored for other tumor types, its application in ovarian tumor is innovative, and contributes to new technologies in public health in Brazil. In this way, the application of this technology could improve the diagnosis and prevention, with a potential early detection and with great impact in life expectancy of patients with ovarian tumor.

Keywords: Ovarian cancer; Aptamers; Diagnosis