Young Kee Shin, Pharm Regul Aff 2017, 6:2 (Suppl)
DOI: 10.4172/2167-7689-C1-027

Development of the molecular diagnostics considering the quality of damaged nucleic acids from formalin-fixed paraffin-embedded tissue samples

Young Kee Shin
Seoul National University, Korea

Cancer molecular diagnostics has rapidly grown through the utilization of the prognostic algorithm and the predictive biomarker for patients. Nucleic acid extracted from formalin-fixed, paraffin-embedded tissues (FFPET) is frequently subjected to dispute because it causes extensive damage and produces imprecise diagnostic result, while it is the most widely used resource for molecular diagnostic analysis. Moreover, the false result of mutation analysis by damaged nucleic acids could cause serious problems in diagnostic fields. Artifactually sequence variants arising from nucleic acid damage in FFPET will be more frequently detected because of stochastic enrichment in the low copy number context increases the risk of false positives. A large amount of previous clinical researches have neglected the quality of samples yielded controversial results. Thus, the evaluation and standardization for the quality of nucleic acid samples should be considered to apply nucleic acids from FFPET to the molecular diagnostics. In the last ten years, we have tried to reflect the quality of nucleic acids from FFPET for prognostic and molecular diagnostic use. First, we developed a novel prognostic model using measurement of RNA expression in FFPET by quantitative real-time RT-PCR to predict the risk of distant metastasis of pN0-N1, hormone receptor-positive, HER2-negative (HR+/HER2−) breast cancer patients. In this development, we applied novel FFPET-specific reference genes to calculate the relative mRNA expression levels of six prognostic genes and standardized mRNA expression value were reflected to its algorithm. Second, we established sample criteria for the minimum DNA quality from FFPET suitable for application to ddPCR-based EGFR mutation test and developed a novel follow-on companion diagnostics kit applying this sample criteria. In summary, the establishment of a robust standard for FFPET-derived nucleic acids would be the most critical point in development of molecular diagnostics and this effort could contribute to mitigation of the molecular diagnostic risk.

Biography

Young Kee Shin contributes to the development of medical care tailored to the individual by simultaneously developing a new anticancer drug and companion diagnostics. As personalized medicine develops, the importance of the development of companion diagnostics accompanied by the development of targeted therapeutic agents has been highlighted. He has already developed a prognostic diagnosis for HR+/HER2- early breast cancer and companion diagnostics kit for lung cancer and colorectal cancer through several national research projects. Through these achievement, the direction of treatment is clearly presented and treatment effect can be continuously monitored while minimizing side effects. He also contributed greatly to improving the quality of life of patients, reducing the economic burden and restoring the health of the health insurance finance. He changed the perception of the regulatory agencies in South Korea where the definitions of the companion diagnostics were not clear, and made a big contribution to establish "Guidelines for *in-vitro* companion diagnostics device approval".

ykeeshin@snu.ac.kr

Notes: