Halioseek®: a dual CD8 and PD-L1 IVD assay to improve NSCLC patients stratification

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Background

Immune checkpoint inhibitors (ICI) can dramatically improve the survival of non-small cells lung cancer (NSCLC) patients. ICI administration is decided according to the expression level of PD-L1 on tumor cells assessed by pathologists despite limited predictive value. Recent studies show that the density of tumor-infiltrating lymphocytes (TILs), especially CD8-positive lymphocytes, may also be a predictive marker in several cancers, including NSCLC. Moreover, the proximity between PD-L1+ and CD8+ cells in the tumor microenvironment is correlated to the response to ICI treatment in melanoma.

We have developed Halioseek® PD-L1/CD8, a standardized dual-staining IVD assay which, in addition to PD-L1 detection, provides critical information on the immune infiltrate through the detection of CD8+ cells on the same tissue section. Halioseek® PD-L1/CD8 includes a Digital Pathology (DP) analysis module to determine PD-L1+ and CD8+ cell densities as well as the proximity between these cell types. Here we show the main analytical performance of Halioseek® and concordance with two PD-L1 IVD assays.

Halioseek® PD-L1/CD8 precision for PD-L1+ TC quantification

The precision of Halioseek® PD-L1/CD8 for PD-L1+ tumor cells quantification was assessed according to LA28-A2 standard on 11 NSCLC tumor resections representative of distinct PD-L1 expression level. 30 consecutive slides per sample were stained across 14 IHC runs on 2 Benchmark XT instruments with 3 batches of antibodies and of revelation kit. 318 NSCLC slides were dual-stained and randomized prior to PD-L1+ TC% assessment by a pathologist. For each class, Fisher’s exact tests were performed.

Comparison of Halioseek® PD-L1/CD8 to SP263 and 22C3 assays on 216 NSCLC samples

216 NSCLC tumors were analyzed with three PD-L1 IHC assays: Halioseek® PD-L1/CD8, DAKO 22C3 and VENTANA SP263. Two pathologists participated to the study. For each sample, the same pathologist interpreted the three slides, according to manufacturers’ instructions. PD-L1+ TC% obtained with each test were confronted to each other.

Halioseek® PD-L1/CD8 Digital Pathology tool performance

Halioseek® PD-L1/CD8 is a new robust IVD assay leveraging the unique features of Halioseek® and proximity indexes as additional digital tools could allow further stratification of patients.

Conclusion

Halioseek® PD-L1/CD8 assay:

- is equivalent to other validated IVD assays SP263 (Ventana) and 22C3 (Dako).
- Therefore it can be used by clinicians for therapeutic indications in NSCLC;
- allows to quantify CD8 T-cells infiltration on the same slide.
- provides additional digital pathology tools which could further improve patients selection for treatment with ICI.

Halioseek® PD-L1/CD8 is a new robust IVD assay leveraging the advantages of DP to combine TILs and PD-L1 quantification within the tumor microenvironment.

Halioseek® PD-L1/CD8 could have a higher predictive performance than existing IVD tests and could fill a major gap in the management of ICI administration. In a next step we intend to investigate the predictive value of the assay on samples from ICI treated patients.