Analysis of NY-ESO-1 expression in specimens from a phase I/II NY-ESO-1 T-cell therapy clinical trial in non-small cell lung cancer and from exploratory studies in multiple tumor types

Background

New York Epithelial Squamous Cell Carcinoma-1 (NY-ESO-1) is a well-known cancer testis antigen. It is highly immunogenic and NY-ESO-1 expression has been reported in patients across various tumor types, including but not limited to non-small cell lung cancer (NSCLC), breast cancer (BC), gastrointestinal (GI) and gastrointestinal stromal tumors (GIST), melanoma (MEL), non-Hodgkin lymphoma (NHL), and squamous cell carcinoma (SCC). The antigen is found in a variety of normal tissues (1-3) and has been documented in several cancers (4).

Methods

Patient tumor specimens from the NCIC CTG 070307 clinical trial in NSCLC and procured FFPE samples from multiple tumor types were stained for NY-ESO-1 expression using IHC (Figures 2 and 3), and percent tumor staining was determined using a single blinded technique. For clinical and exploratory testing, a run-on control of normal keratin (negative) and normal keratin (positive), was processed concurrently in each run. Stained specimens were scanned at a blinded pathology center.

Aims

To describe the expression patterns of NY-ESO-1 in lung samples from patients with NSCLC using an NY-ESO-1-1 HC clinical trial.

To explore the expression and staining patterns of NY-ESO-1 protein expression in commercially procured GAC, EAC, GEJ, UTC, HNSCC, TMB-C, and melanoma FFPE specimens.

Aims

To determine the NY-ESO-1 expression patterns in primary vs metastatic NSCLC.

To explore the expression and staining patterns of NY-ESO-1 protein expression in commercially procured GAC, EAC, GEJ, UTC, HNSCC, TMB-C, and melanoma FFPE specimens.

Results

• The observed positivity rate (using a cutoff of 1% Tumor and ≥1+ staining intensity for NSCLC samples) was 1% (4/425), 8% (3/37), 1% (1/102), and 1% (1/103) NY-ESO-1 (Figure 1).

• A positivity rate for primary tumors was 15% (29/191) 95% CI [0.20%, 0.34] and 14% (19/132) 95% CI [0.29%, 0.39] for metastatic tumors (Figure 3).

Conclusions

For NSCLC and multiple tumor types, the IHC clinical trial demonstrated similar NY-ESO-1 expression across the range of staining intensities and similar percentages of positivity.

For NSCLC specimens, the staining characteristics (% Tumor, intensity) for primary metastatic tumor types were consistent with previously published references. For other tumor types, NY-ESO-1 expression patterns consistently displayed cytoplasmic and nuclear staining in NSCLC and other tumor types.

The observed NY-ESO-1 positivity rate in the tested cohort is consistent with the literature where the ESCC clone was used.

Target finding noted that an IHC assay for NY-ESO-1 detection in additional tumor types may be considered for use as a clinical trial assay.

Clinical trial advancements in T-cell therapies

CD8+/-CD19-/-CD16-/-CD19+/-T CR (GSX300161) clinical efficacy and safety are being evaluated further in a phase 1/2 clinical trial using NY-ESO-1 as a target of multiple tumor types as part of GSK’s master protocol NY-ESO-1 CTB-1 T-cell trial.

An NY-ESO-1 IHC assay is a robust approach to identify patients who may be eligible for CD8+/-CD19-/-CD16-/-CD19+/-T CR-1 T-cell treatment.