Comprehensive Immune and Molecular Analysis of Two Metastatic Melanoma Patients Treated with a Personal Neoantigen Vaccine, NEO-PV-01, in Combination with Anti-PD1: A Case Study

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Background

Neoantigens arise from DNA mutations and are critical targets that are presented on the surface of cancer cells which have specific T-cell responses.1,2

Methods

- Tumor samples were collected from metastatic melanoma lesions from the two patients at baseline and after treatment with the NEO-PV-01 neoantigen vaccine.

- Whole exome sequencing and gene expression analysis were performed to identify neoantigens.

- ELISpot, intracellular cytokine staining, and enzyme-linked immunospot (ELISpot) were used to measure cytokine production.

- Flow cytometry was used to analyze T-cell responses.

- Immunohistochemistry (IHC) was performed to assess tumor infiltration.

- Tumor regression was assessed using computed tomography (CT) scans.

Results

Table 1: Patient Characteristics

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>Diagnosis</th>
<th>Therapy</th>
<th>Follow-up (mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>53</td>
<td>F</td>
<td>Melanoma</td>
<td>Nivolumab</td>
<td>12</td>
</tr>
<tr>
<td>M4</td>
<td>56</td>
<td>F</td>
<td>Metastatic Melanoma</td>
<td>Neoantigen Vaccine + Nivolumab</td>
<td>12</td>
</tr>
</tbody>
</table>

- Neoantigen-reactive T cells were present in both patients before treatment.

- neoantigens were identified and presented on the surface of tumor cells in both patients.

- T-cell responses were measured using ELISpot and intracellular cytokine staining.

- Neoantigen-reactive T cells were detected in blood samples from both patients.

- Tumor regression was observed in both patients after treatment.

- Tumor biopsy samples were collected to perform IHC analysis.

- Tumor infiltration increased in both patients after treatment.

- Tumor regression was confirmed using CT scans.

Summary

- Neoantigen-reactive T cells were detected in both patients before treatment.

- Neoantigen-reactive T cells were induced by neoantigen vaccination.

- Tumor regression was observed in both patients after treatment.

- Further studies are needed to validate the clinical benefit of neoantigen vaccines.

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References
