**SUPPLEMENTAL MATERIAL**

Table S1 Patient characteristics by type of index therapy

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| Demographic and Clinical Characteristics | Study Cohort (N=279)a | Immunotherapy a | BRAFi/MEKi (N=109) | Other (N=44) |
| anti-PD-1 (N=27) | anti-PD-1 /CTLA-4 combination (n=66) | CTLA-4 (n=33) |  |  |
| Median (min, max) age at initial diagnosis, years | 64 (18, 84)  | 65.0 (28,79)  | 66.0 (32,84)  | 71.0 (41,83)  | 57.0 (18,83)  | 67.0 (20,82)  |
| Median (min, max) age at index therapy, years | 67 (23-85)  | 69.0 (34,82)  |  71.0 (34,85)  | 74.0 (47,84)  | 62.0 (23,85)  | 69.0 (29,84)  |
| Male | 65%  | 63% | 65% | 82% | 61% | 66% |
| White | 88%  | 89% | 91% | 82% | 87% | 89% |
| ECOG 0/1 | 62% | 67% | 67% | 45% | 63% | 61% |
| Stage IV at initial diagnosis | 28% | 26% | 23% | 24% | 27% | 41% |
| Brain Mets | 28% | 26% | 27% | 27% | 26% | 34% |
| LDH elevated | 33% | 33% | 27% | 24% | 32% | 50% |
| BRAF mutation | 50% | 15% | 23% | 21% | 96% b | 18% |
| 2L / 3L use | 76%/24% | 56%/ 44% | 82% / 18% | 82%/ 18% | 80%/ 20% | 64%/ 36% |
| 2L: second line; 3L: third line; anti-PD-1: Programmed cell death protein 1; BRAF: a human gene that encodes the protein B-Raf; BRAFi: BRAF inhibitor; CTLA-4: cytotoxic T-lymphocyte-associated protein 4; ECOG: Eastern Cooperative Oncology Group; LDH: Lactate dehydrogenase; MEKi: MEK inhibitora: 25 patients with anti-PD-1/other as index therapy were not shown in this tableb: 3 patients with BRAF wild-type tumor and 1 patient with missing tumor BRAF mutation status used BRAFi/MEKi. Among the 3 patients with BRAFwild-type tumor, 1 patient used MEKi only; 1 patient had a BRAF wild-type result before index date and a positive BRAF mutation result after index date, as we only used BRAF result before index date, we categorized this patient as having negative BRAF mutation; 1 patient had both BRAF negative and positive results before index date, but the negative result was closer to the index date, so we categorized this patient as having negative BRAF mutation. However, a closer look at the data showed the negative result was from blood sample and the positive result was from tissue sample. This patient might have been misclassified as having negative BRAF mutation. As only 3% of biomarker results were from blood, we speculated the misclassification of gene mutation status in this study was minimal.  |