**Supplementary Table S1. Biospies from patients treated with BRAF inhibitors**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Patient # | Histology | Treatment | Day of excision | Mutational status | BRAF-CRAF score | pERK A score | pERK Bscore |
| 1 | cuSCC | Dabrafenib | 46 | TGFBR1 V153I and A202V | 4 | nd | nd |
| 1 | Verrucous papilloma | Dabrafenib | 46 | TGFBR1 V153I, PIK3CA E545K and E542K | 4 | nd | nd |
| 2 | Verrucous papilloma | Vemurafenib | 290 | wt | 4 | 3 | 3 |
| 2 | Transformed CMN Breslow 0.6mm | Vemurafenib | 220 | NRAS Q61K | 3 | nd | nd |
| 3 | Verrucous papilloma | Vemurafenib | 55 | KRAS G12D | 4 | nd | nd |
| 4 | SSM Breslow 0.3mm | Vemurafenib | 56 | wt | 2.5 | 4 | 2 |
| 5 | cuSCC | Vemurafenib | 56 | HRAS G12C | 3.5 | 3 | 2 |
| 5 | Verrucous papilloma | Vemurafenib | 56 | HRAS G12V | 3 | 3 | 3 |
| 5 | cuSCC | Vemurafenib | 56 | HRAS G12D | 3 | 5 | 3 |
| 5 | Verrucous papilloma | Vemurafenib | 56 | wt | 3.5 | 5 | 2 |
| 5 | Verrucous papilloma | Vemurafenib | 134 | wt | 4 | 2 | 1 |
| 5 | Verrucous papilloma | Vemurafenib | 134 | KRAS G12C | 3 | 3 | 2 |
| 5 | Verrucous papilloma | Vemurafenib | 134 | wt | 1.5 | 4 | 3 |
| 6 | cuSCC lymph node relapse | Vemurafenib | 60 | nd | nd | nd | nd |
| 7 | cuSCC | Vemurafenib | 63 | wt | 2 | nd | nd |
| 7 | Verrucous papilloma | Vemurafenib | 105 | wt | 4 | 3 | 2 |
| 8 | Verrucous papilloma | Vemurafenib | 50 | KRAS G12V | 4 | nd | nd |
| 8 | Verrucous papilloma | Vemurafenib | 50 | KRAS G12V | 4 | nd | nd |
| 11 | Verrucous papilloma | Vemurafenib | 75 | PTEN del exon 8 | 2.5 | 3 | 3 |
| 12 | Verrucous papilloma | Vemurafenib | 185 | HRAS G12D G115E | 4 | 3 | 2 |
| 13 | Verrucous papilloma | Vemurafenib | 21 | HRAS G12D | 3 | 3 | 1 |
| 13 | Verrucous papilloma | Vemurafenib | 21 | wt | 2 | 4 | 2 |
| 13 | Verrucous papilloma | Vemurafenib | 21 | nd | 2 | nd | nd |
| 13 | KA | Vemurafenib | 168 | wt | 3 | nd | nd |
| 13 | SSM | Vemurafenib | 84 | nd | nd | nd | nd |
| 14 | Verrucous papilloma | Vemurafenib | 60 | KRAS G12D | 4 | 4 | 3 |
| 16 | cuSCC | Vemurafenib | 88 | wt | 2.5 | 2 | 3 |
| 16 | cuSCC | Vemurafenib | 109 | wt | 1 | nd | nd |
| 16 | Verrucous papilloma | Vemurafenib | 63 | HRAS Q61L | 1.5 | 2 | 2 |
| 17 | Verrucous papilloma | Dabrafenib | 197 | HRAS Q61L | 3 | 5 | 2 |
| 18 | Verrucous papilloma | Vemurafenib | 20 | nd | 3.5 | nd | nd |
| 19 | Verrucous papilloma | Vemurafenib | 168 | wt | 2.5 | 4 | 3 |
| 20 | Urothelial carcinoma | Vemurafenib | 55 | KRAS G12V | 2.5 | 6 | 3 |
| 21 | Verrucous papilloma | Dabrafenib | 30 | KRAS G13R | 2 | 3 | 2 |
| 22 | SSM in situ | Vemurafenib | 208 | nd | 3 | 3 | 3 |
| 23 | KA | Vemurafenib | 32 | HRAS G12D, EGFR Q701H | 3.5 | 2 | 2 |
| 23 | KA | Vemurafenib | 32 | HRAS G12D, PIK3CA E542K | 3.5 | 2 | 2 |
| 23 | Gingival SCC in situ | Vemurafenib | 117 | nd | nd | 5 | 2 |
| 23 | KA | Vemurafenib | 56 | HRAS G12D | 3 | 4 | 1,5 |
| 23 | Verrucous papilloma | Vemurafenib | 96 | wt | 3 | 3 | 2 |
| 23 | cuSCC | Vemurafenib | 154 | CDKN2A P114L | 3 | 4 | 3 |
| 24 | Verrucous papilloma | Vemurafenib | 55 | wt | 4 | nd | nd |
| 24 | cuSCC | Vemurafenib | 94 | PTEN del exon8 | 4 | 3 | 2 |
| 25 | cuSCC | Vemurafenib | 56 | wt | 2.5 | nd | nd |
| 25 | Verrucous papilloma | Vemurafenib | 56 | wt | 3 | 3 | 2 |
| 25 | Verrucous papilloma | Vemurafenib | 56 | HRAS G115E, CDKN2A L30F | 3 | 3 | 3 |
| 25 | Verrucous papilloma | Vemurafenib | 56 | HRAS G13V | 2 | nd | nd |
| 25 | Verrucous papilloma | Vemurafenib | 115 | wt | 3 | 5 | 3 |
| 26 | Verrucous papilloma | Vemurafenib | 63 | wt | 4 | 3 | 1 |
| 26 | KA | Vemurafenib | 63 | nd | 3 | nd | nd |
| 27 | KA | Vemurafenib | 58 | HRAS G12D | 4 | 3 | 2 |
| 27 | KA | Vemurafenib | 58 | HRAS Q61L | 3 | nd | nd |
| 27 | KA | Vemurafenib | 57 | HRAS G12D, TGFBR1 G52E | 4 | nd | nd |
| 27 | cuSCC | Vemurafenib | 84 | HRAS G12D | 3 | 5 | 3 |
| 27 | cuSCC | Vemurafenib | 84 | HRAS G12D | 3.5 | nd | nd |
| 27 | Verrucous papilloma | Vemurafenib | 84 | KRAS G12D | 3.5 | 3 | 3 |
| 27 | cuSCC | Vemurafenib | 84 | HRAS Q61L, PI3KCA E545K | 4 | 3 | 3 |
| 27 | KA | Vemurafenib | 56 | HRAS Q61L | 4 | 2 | 2 |
| 28 | BCC | Vemurafenib | 21 | KIT G658E | 0.5 | 1 | 2 |
| 28 | BCC | Vemurafenib | 42 | KIT D572N | 0.5 | 1 | 1 |
| 28 | BCC | Vemurafenib | 75 | KIT H790Y | 0.5 | 1 | 0 |
| 29 | Verrucous papilloma | Vemurafenib | 105 | HRAS Q61L | 2.5 | 4 | 3 |
| 29 | Verrucous papilloma | Vemurafenib | 187 | HRAS Q61L | nd | 3 | 3 |
| 29 | Verrucous papilloma | Vemurafenib | 208 | HRAS Q61L | 3.5 | 2 | 2 |
| 29 | KA | Vemurafenib | 64 | HRAS Q61L, PI3KCA H1047R | 3.5 | 5 | 2,5 |
| 29 | Verrucous papilloma | Vemurafenib | 64 | HRAS Q61L | 4 | 3 | 3 |
| 29 | Verrucous papilloma | Vemurafenib | 154 | HRAS Q61L | 4 | 3 | 3 |
| 30 | Transformed CMN Breslow 0.37mm | Vemurafenib | 222 | wt | 0.5 | 5 | 2 |
| 31 | SSM Clark II | Vemurafenib | 59 | NRAS Q61K | 3 | 2 | 1.5 |
| 31 | SSM in situ | Vemurafenib | 59 | wt | 2.5 | 2 | 1.5 |
| 32 | Vulvar SCC | Vemurafenib | 83 | HRAS G13V | 4 | 5 | 3 |
| 33 | Lingual SCC | Vemurafenib | 210 | HRAS G12S | nd | nd | nd |
| 34 | Verrucous papilloma | Vemurafenib | 15 | HRAS Q61R, PI3KCA E542K | 3 | 4 | 3 |