

**Supplementary Fig. 1** Histologic features of gangliogliomas with various genetic alterations.

**a,b** Ganglioglioma in the spinal cord of a 5 year old girl with *KIAA1549-BRAF* gene fusion (SF-GG-24).

**c** Ganglioglioma in the temporal lobe of a 9 year old girl with *CDC42BPB-BRAF* gene fusion (SF-GG-26).

**d** Ganglioglioma in the temporal lobe of a 32 year old woman with *KRAS* p.Q61K mutation (SF-GG-29).

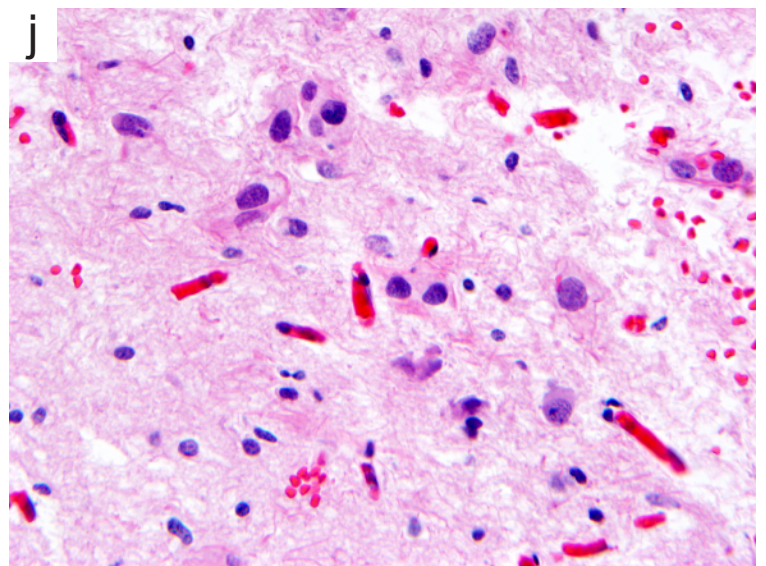
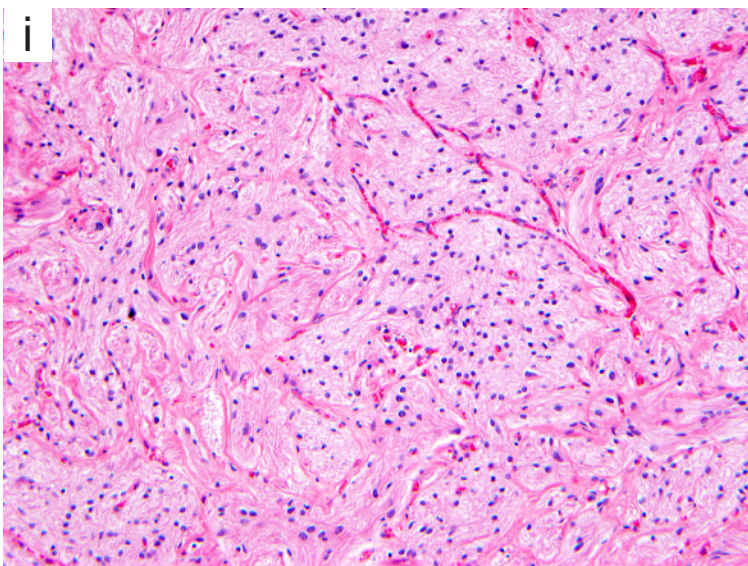
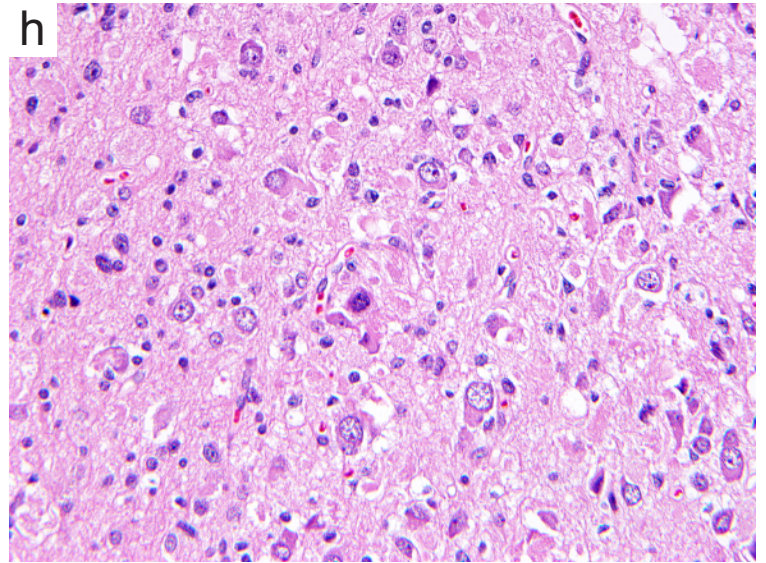
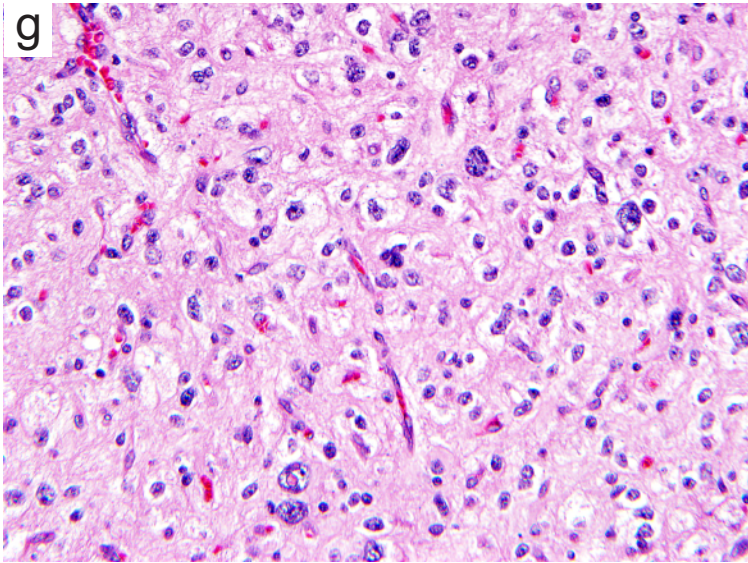
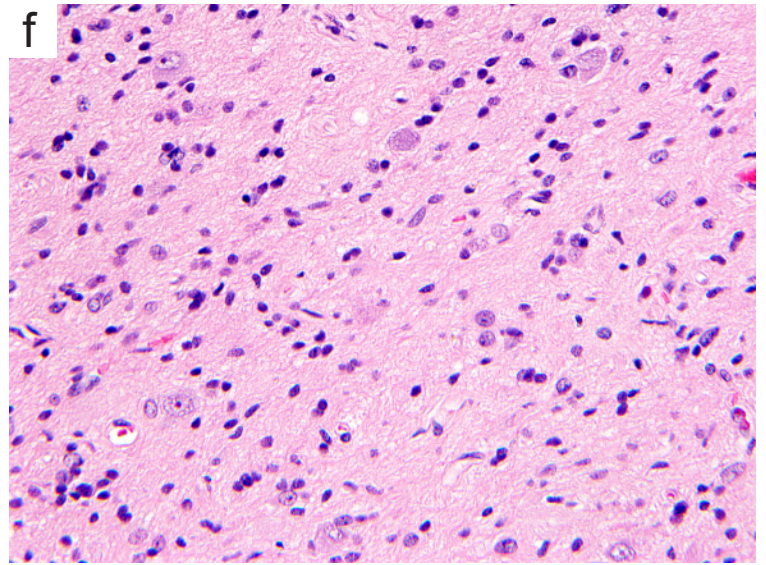
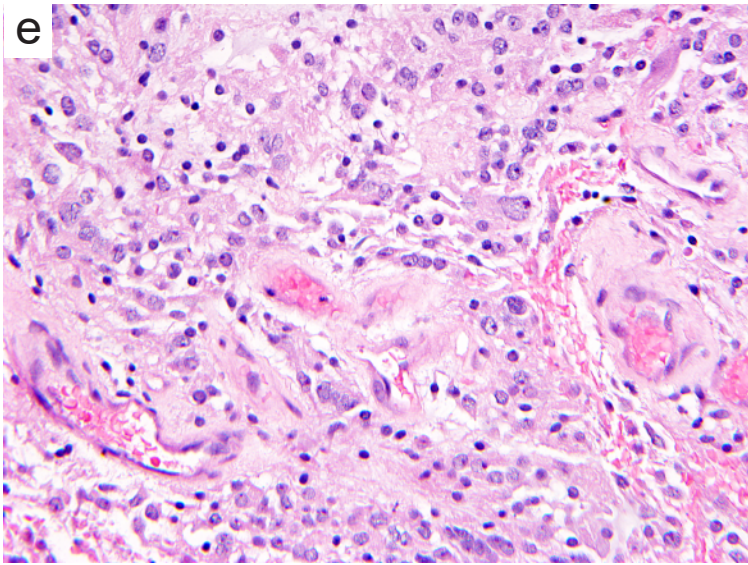
**e** Ganglioglioma in the temporal lobe of a 28 year old man with germline *NF1* mutation and somatic loss of the remaining wildtype allele in the tumor (SF-GG-31).

**f** Ganglioglioma in the temporal lobe of 59 year old woman with *FGFR1* p.N546K mutation (SF-GG-33).

**g,h** Ganglioglioma in the temporal lobe of a 7 year old boy with *FGFR2-KIAA1598* gene fusion (SF-GG-34).

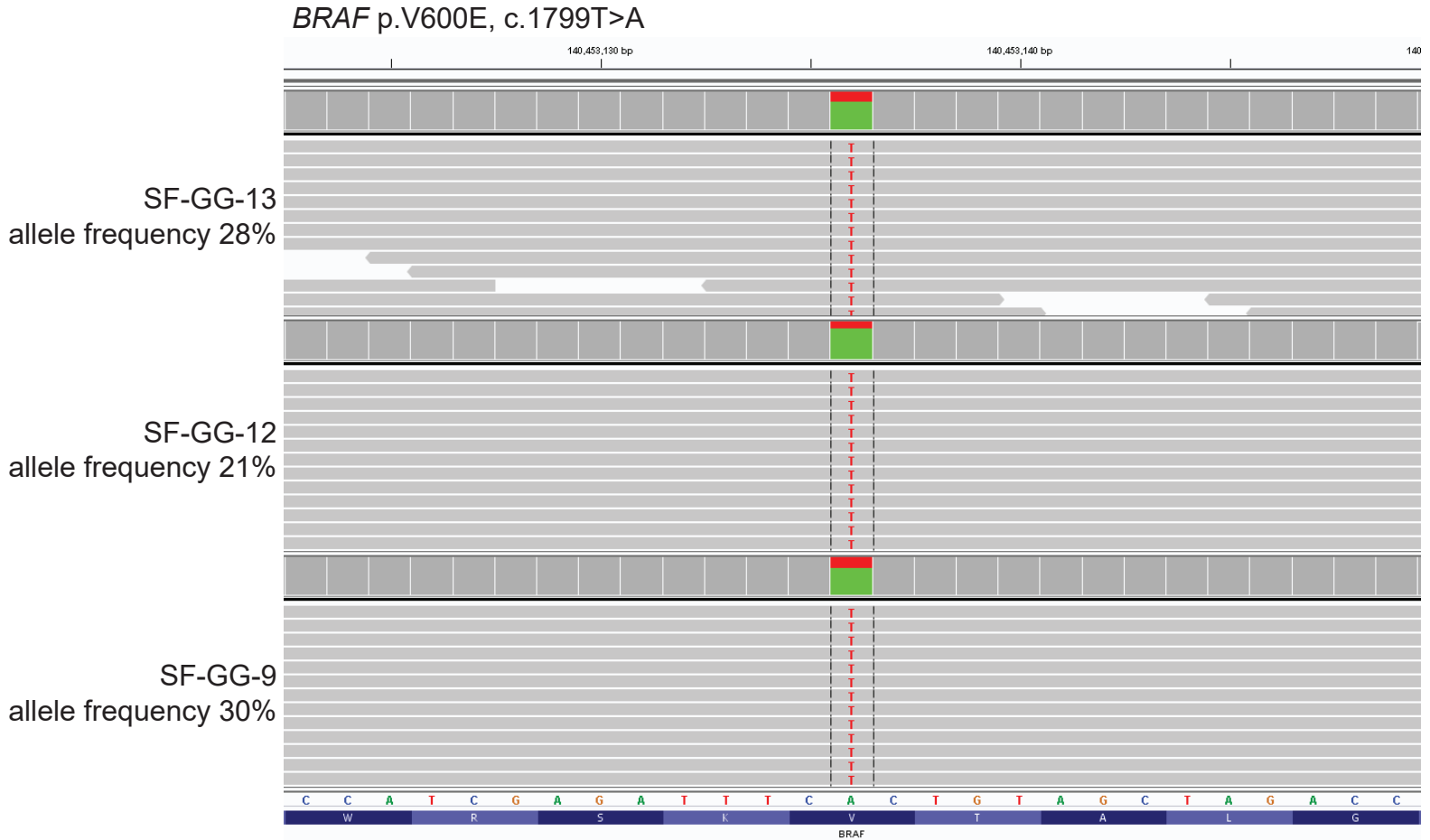
**i,j** Ganglioglioma in the frontal lobe of a 2 year old boy with *ABL2-GAB2* gene fusion (SF-GG-37).







a

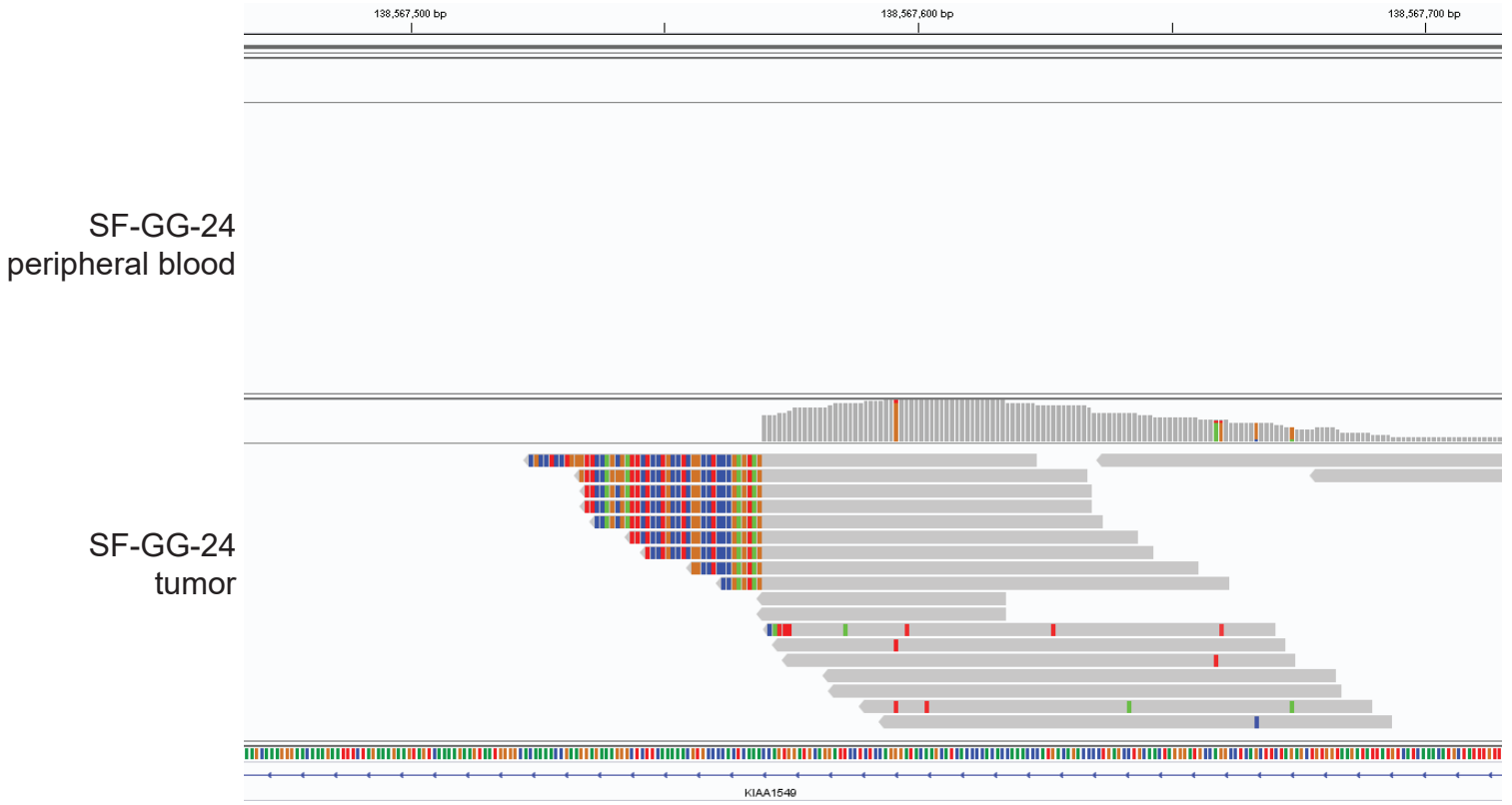


**Supplementary Fig. 2** Snapshots from the Integrated Genome Viewer of genetic alterations identified in the 40 gangliogliomas. **a** Gangliogliomas with *BRAF* p.V600E mutation. **b** Ganglioglioma with *BRAF* p.T599\_W604delinsTDG mutation. **c** Gangliogliomas with *BRAF* p.R506delins mutation. **d** Ganglioglioma with *KIAA1549-BRAF* fusion. **e** Ganglioglioma with *CDC42BPB-BRAF* fusion. **f** Ganglioglioma with *KLHL7-BRAF* fusion. **g** Ganglioglioma with *ERC2-RAF1* fusion. **h** Gangliogliomas with *KRAS* p.Q61K mutation. **i** Ganglioglioma in patient with a heterozygous germline *NF1* p.Q514frameshift mutation with somatic loss of the remaining wildtype allele in the tumor. **j** Ganglioglioma with *FGFR1* p.N546K mutation. **k** Ganglioglioma with *FGFR2* exon 17 splice acceptor mutation. **l** Ganglioglioma with *FGFR1-TACC1* fusion. **m** Ganglioglioma with *FGFR2-KIAA1598* fusion. **n** Ganglioglioma with *FGFR2-INA* fusion. **o** Ganglioglioma with *ABL2-GAB2* fusion.



d

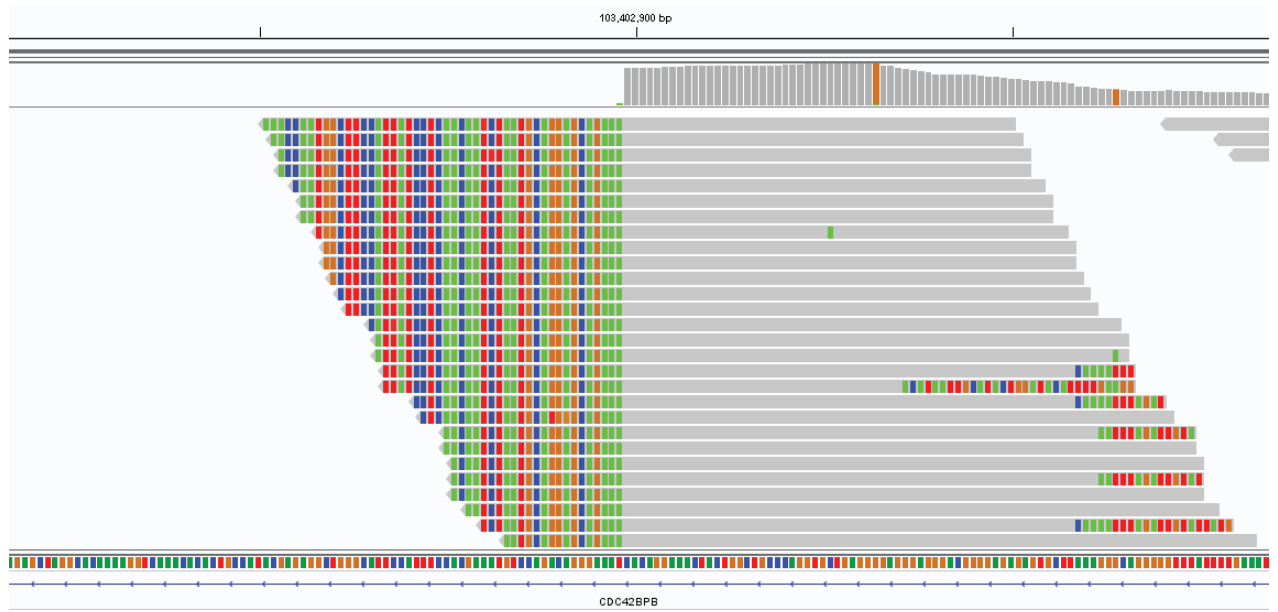
*KIAA1549-BRAF* fusion (exons 1-10 of *KIAA1549* to exons 9-18 of *BRAF*)



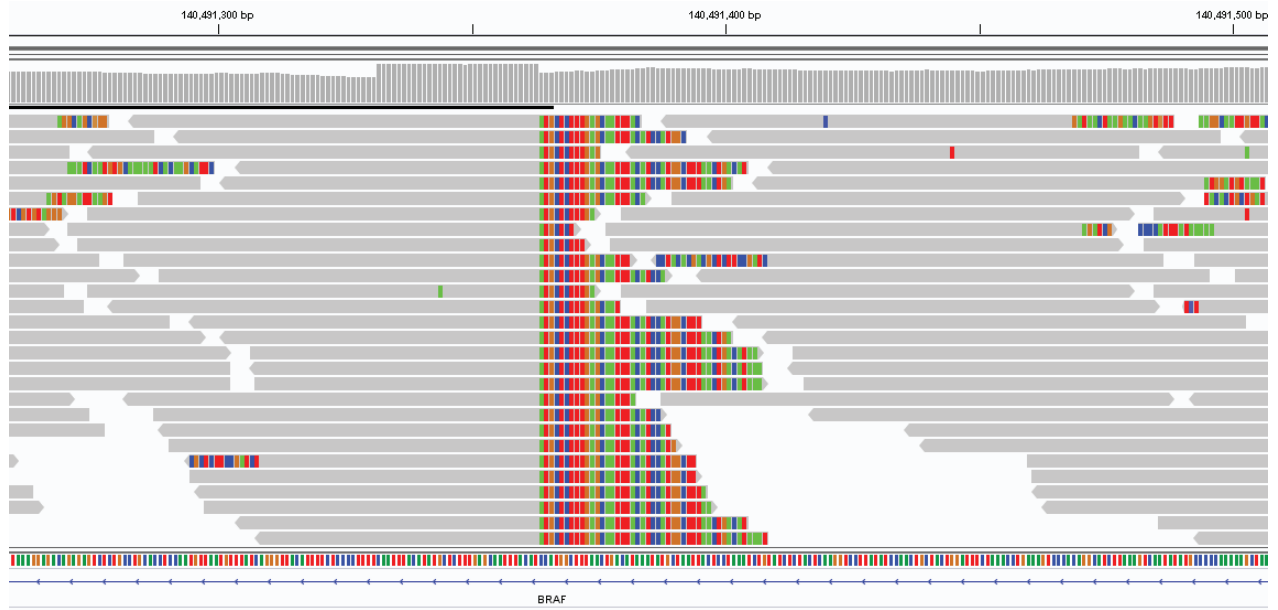
e

*CDC42BPB-BRAF* fusion (exons 1-36 of *CDC42BPB* to exons 9-18 of *BRAF*)

SF-GG-26

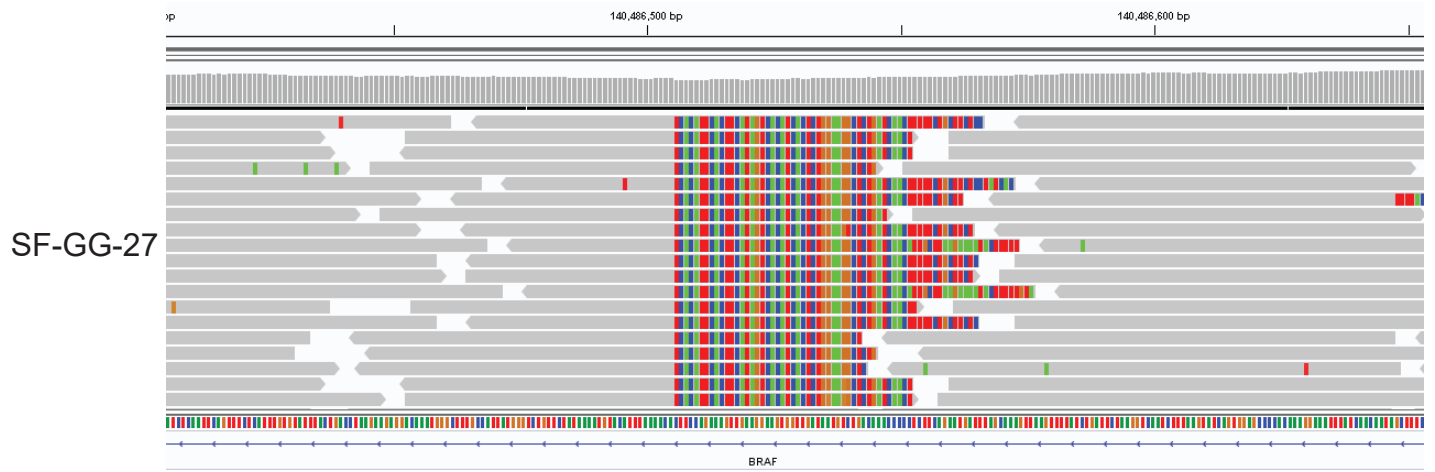
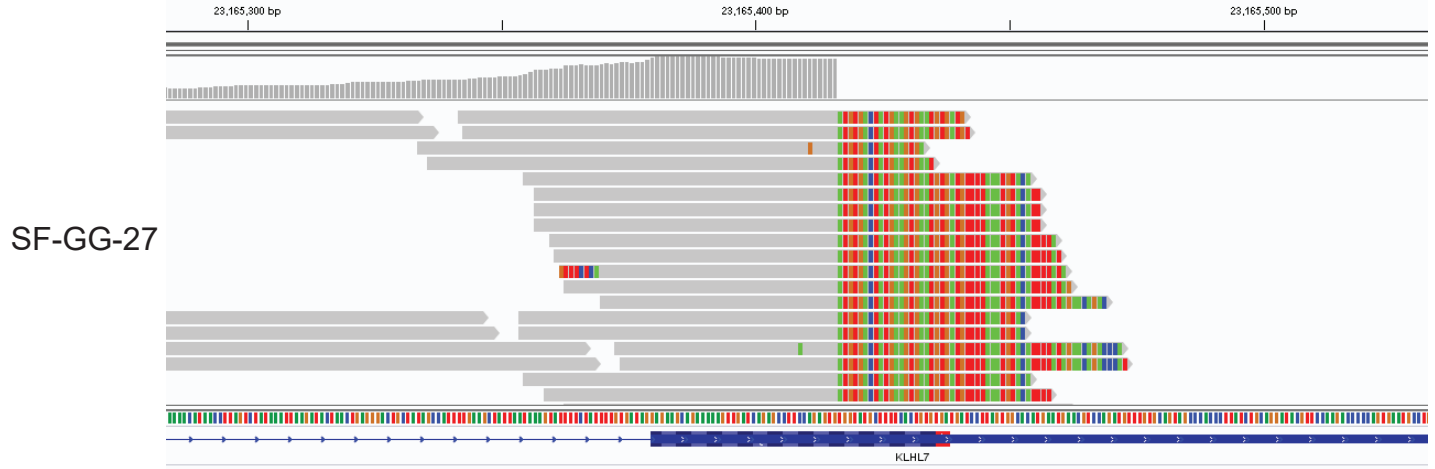


SF-GG-26



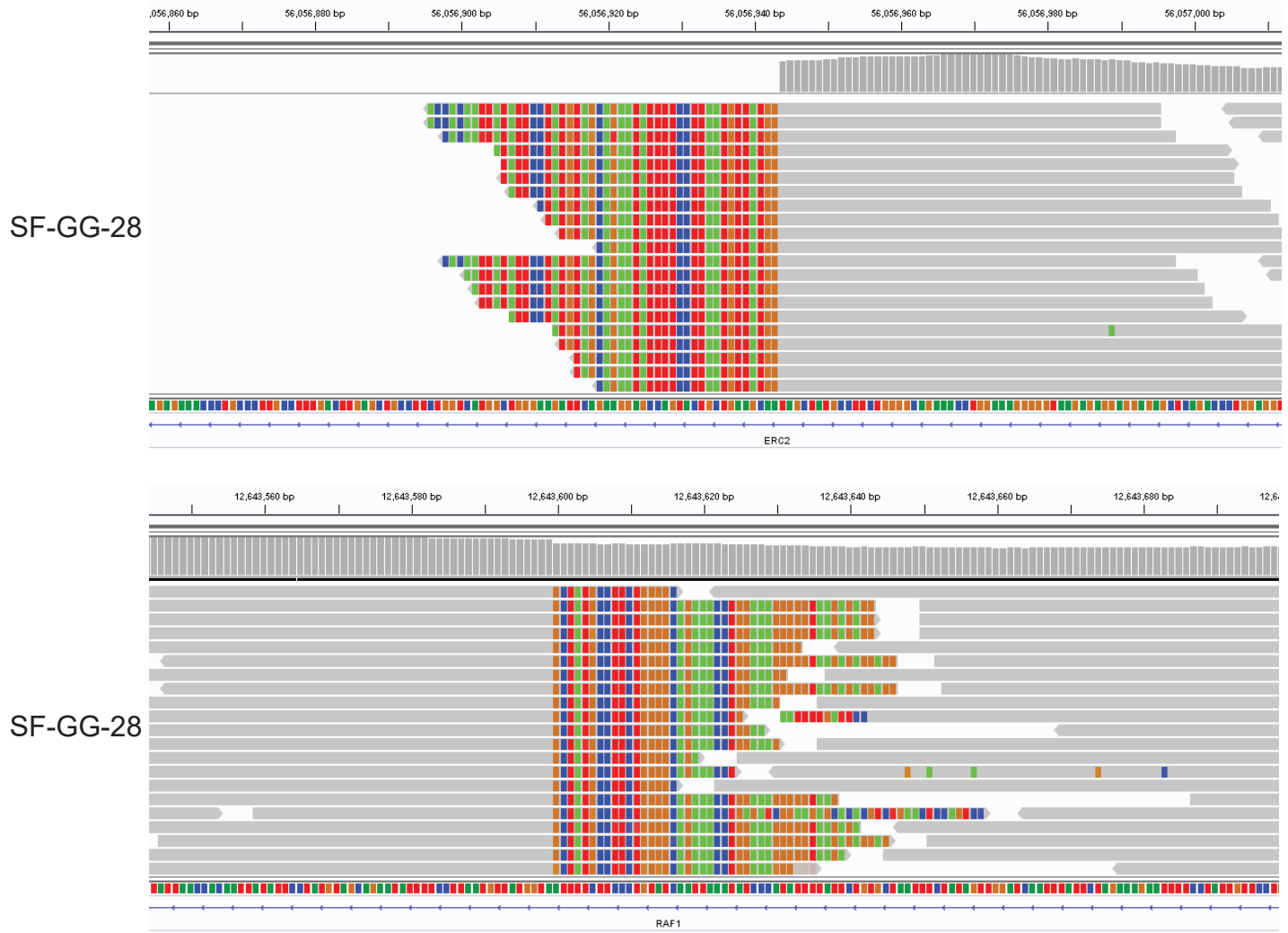
f

*KLHL7-BRAF* fusion (exons 1-4 of *KLHL7* to exons 10-18 of *BRAF*)



g

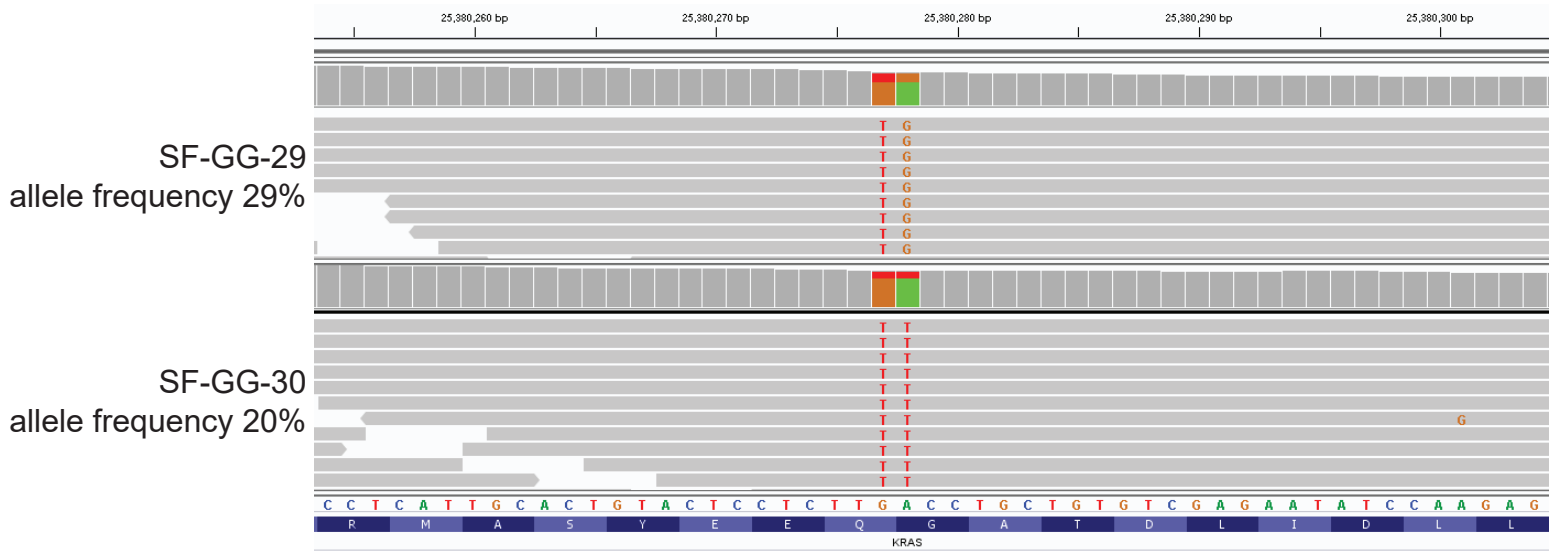
*ERC2-RAF1* fusion (exons 1-7 of *ERC2* to exons 8-17 of *RAF1*)





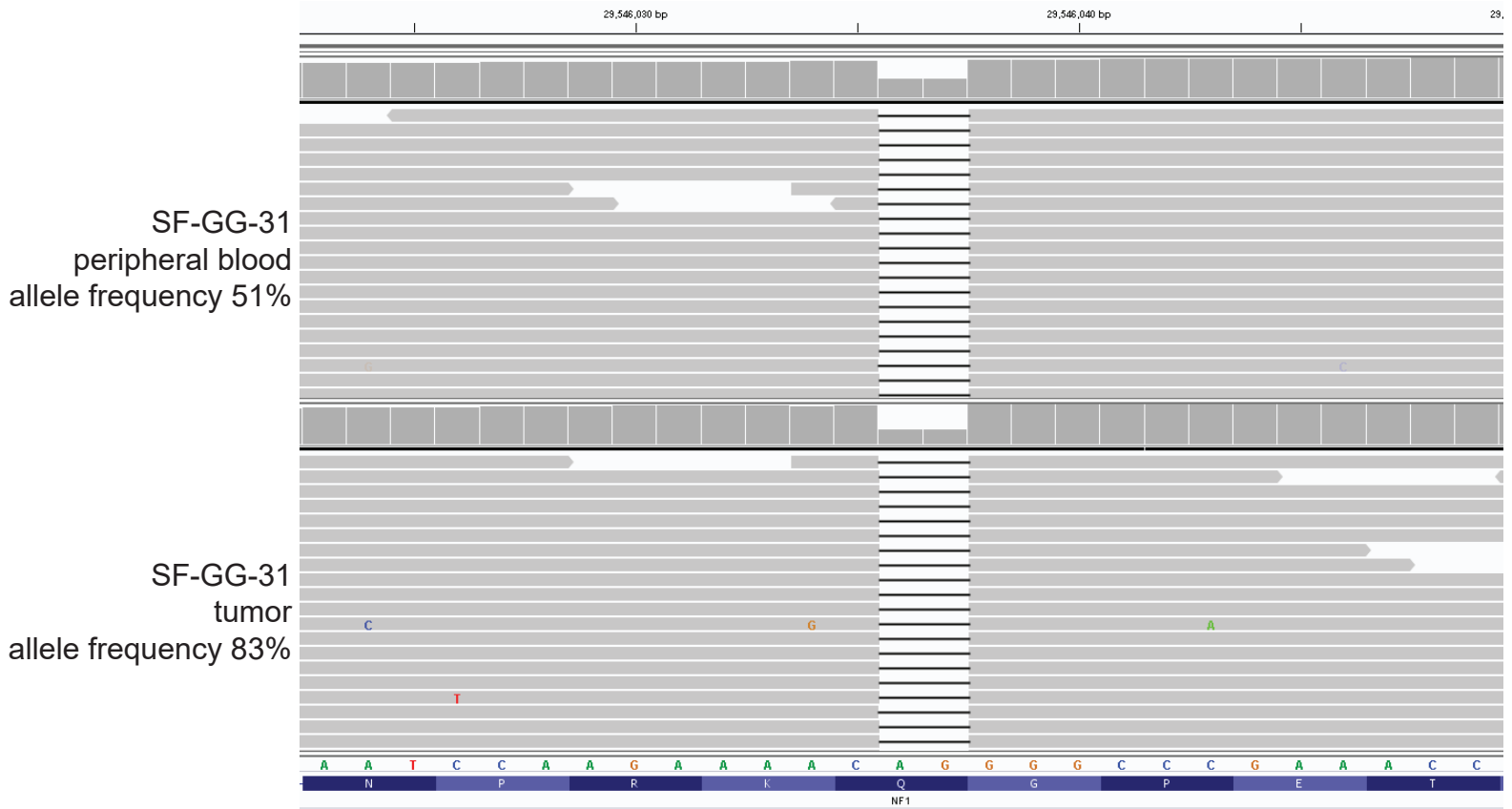
h

*KRAS* p.Q61K, c.180\_181delinsCA (SF-GG-29) and c.180\_181delinsAA (SF-GG-30)



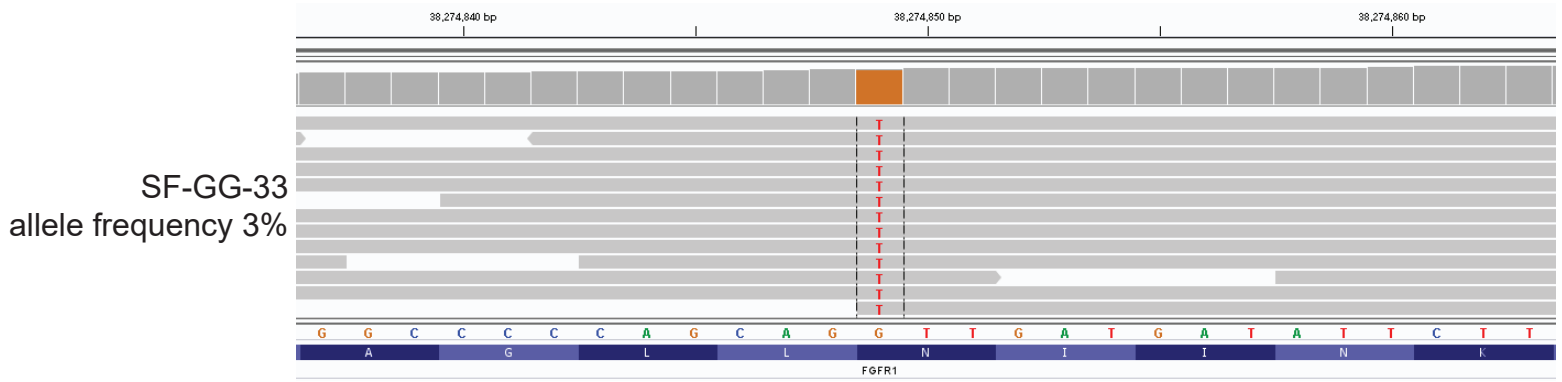
i

*NF1* p.Q514frameshift, c.1541\_1542del



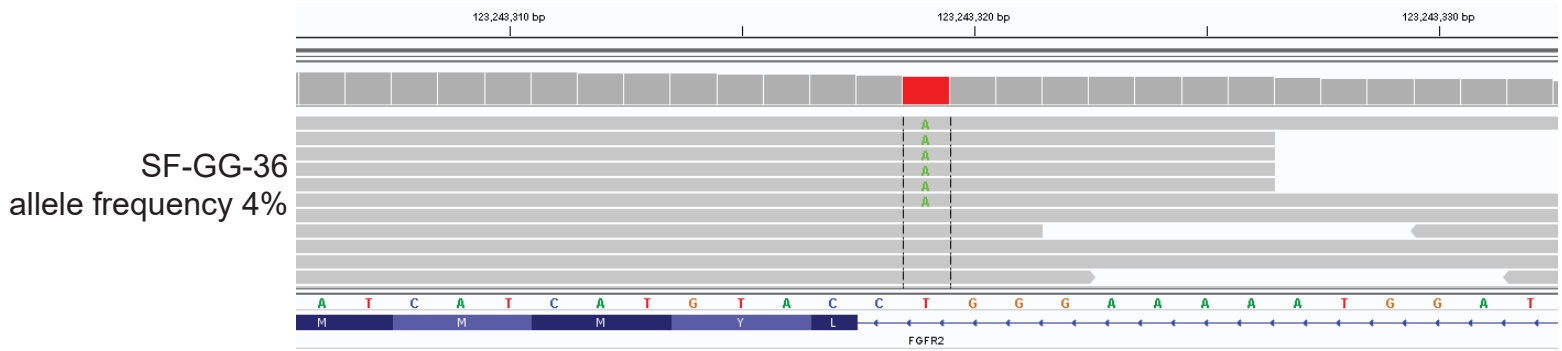
j

*FGFR1* p.N546K, c.1638C>A

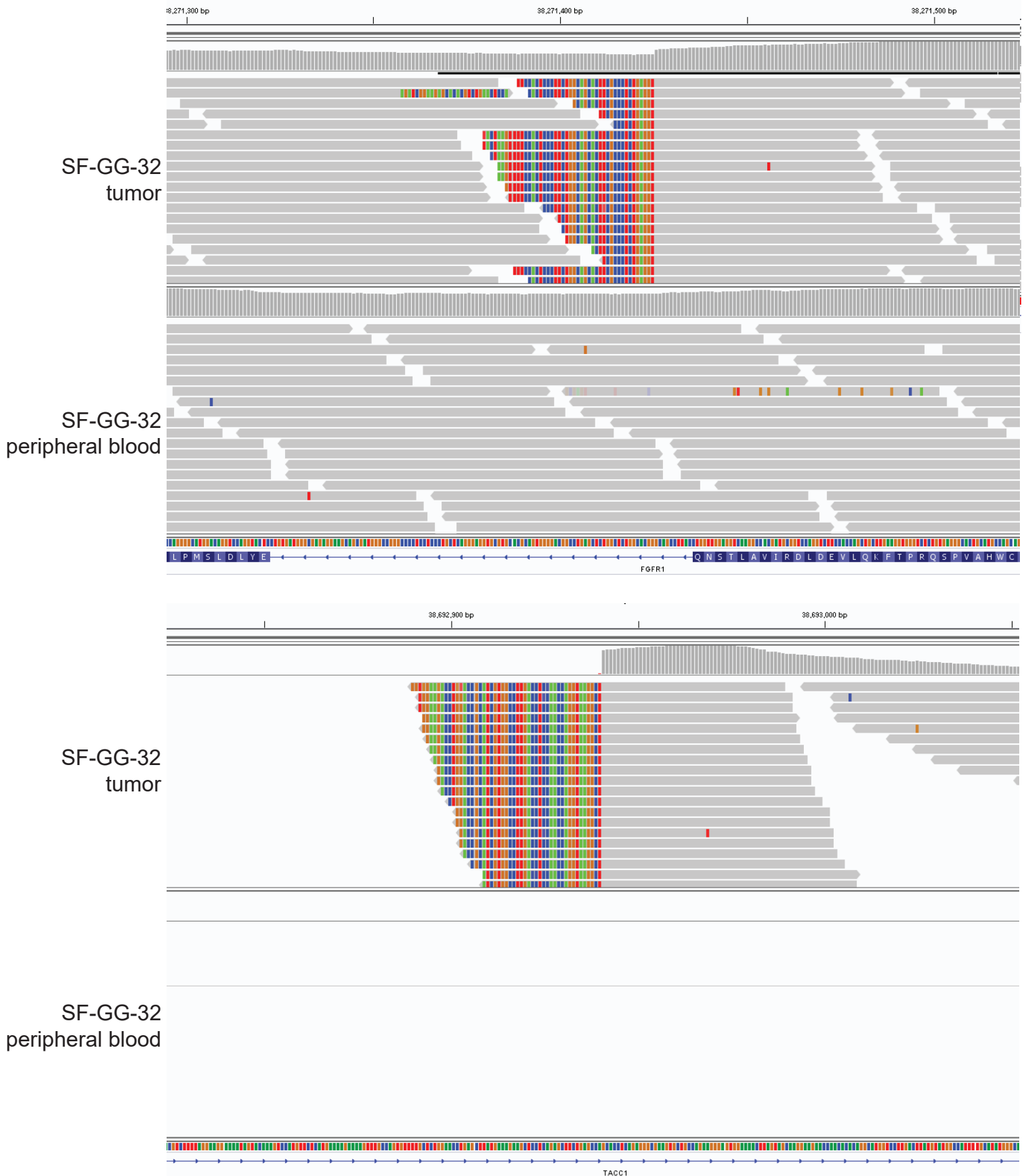


k

*FGFR2* exon 17 splice acceptor, c.2199-2A>T



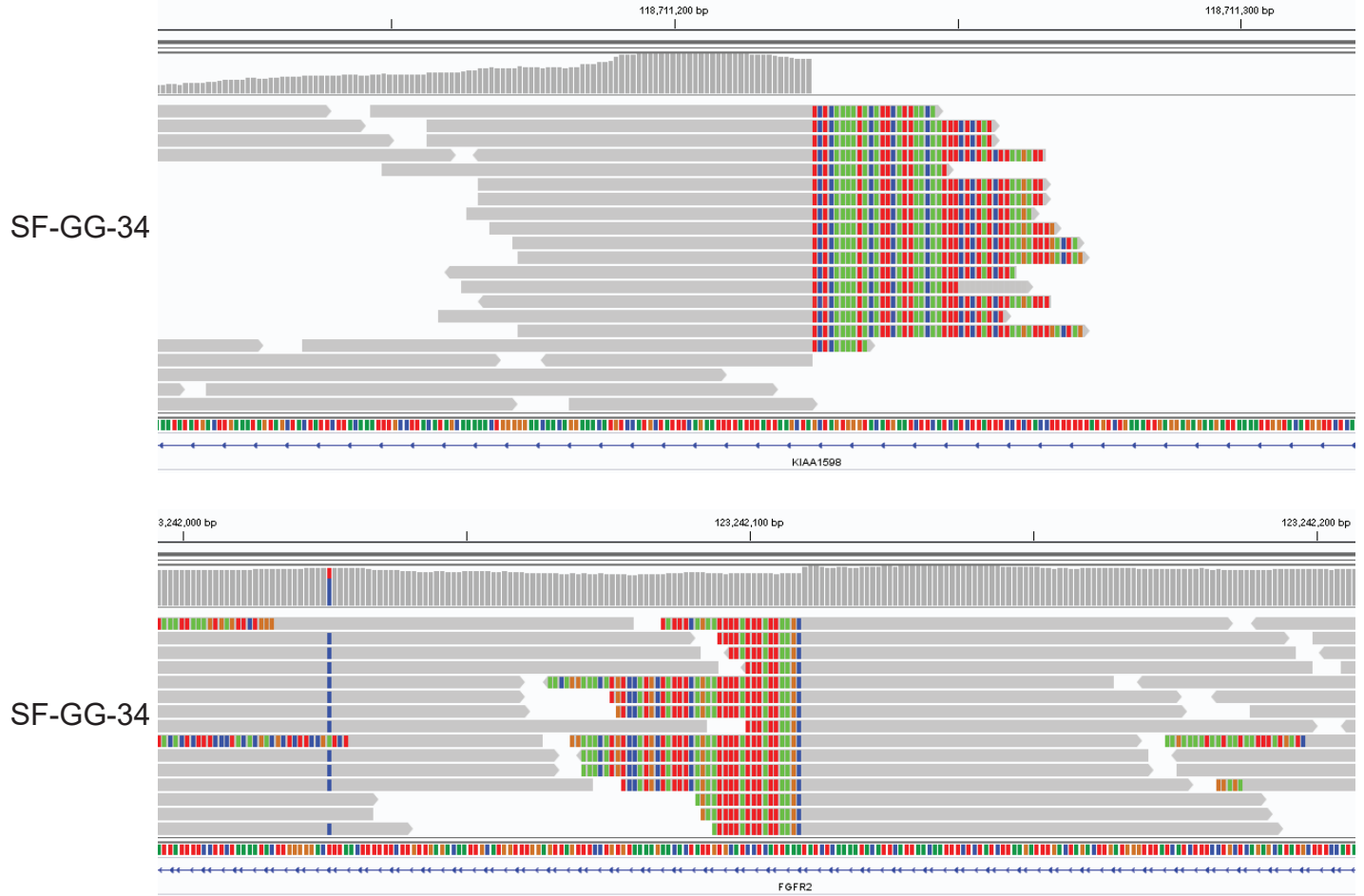
*FGFR1-TACC1* fusion (exons 1-18 of *FGFR1* to exons 7-13 of *TACC1*)





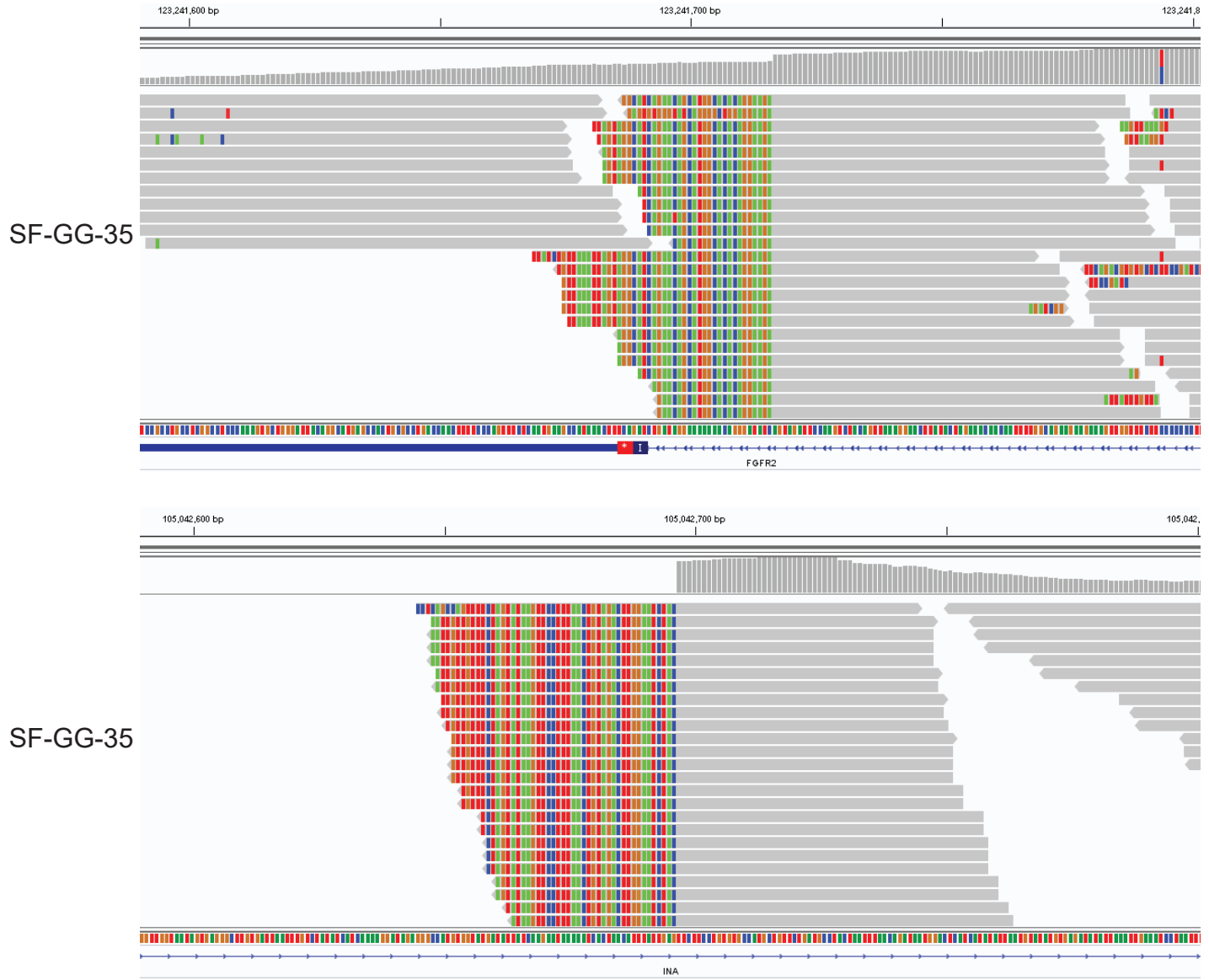
m

*FGFR2-KIAA1598* fusion (exons 1-17 of *FGFR2* to exons 7-17 of *KIAA1598*)



n

*FGFR2-INA* fusion (exons 1-17 of *FGFR2* to exons 2-3 of *INA*)



O

*ABL2-GAB2* fusion (exons 1-10 of *ABL2* to exons 5-10 of *GAB2*)

