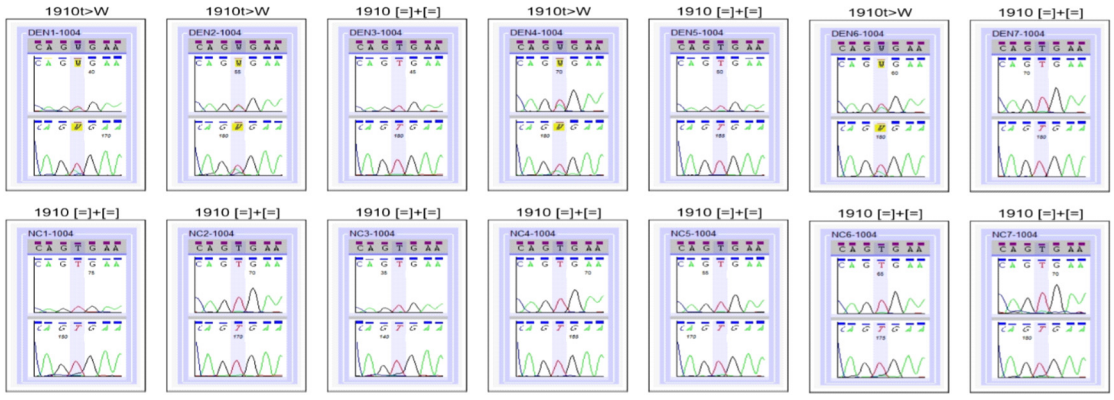
**Supplementary Table S1. Detailed information of all liver specimens from vehicle- and DEN-treated mice.**

| Specimen ID | Genotype | Base Position | Genotype Result | User Edit | QV | Base Position Coverage | Amplicon ID | Layer ID | ROI ID | ROI Position | Genotype Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DEN1-1004 | 1910t>W | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN2-1004 | 1910t>W | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN3-1004 | [=]+[=] | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN4-1004 | 1910t>W | 1910 | - | no | 52 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN5-1004 | [=]+[=] | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN6-1004 | 1910t>W | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN7-1004 | [=]+[=] | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC1-1004 | [=]+[=] | 1910 | - | no | 49 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC2-1004 | [=]+[=] | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC3-1004 | [=]+[=] | 1910 | - | no | 47 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC4-1004 | [=]+[=] | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC5-1004 | [=]+[=] | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC6-1004 | [=]+[=] | 1910 | - | no | 46 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| NC7-1004 | [=]+[=] | 1910 | - | no | 40 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |

A

| Primer name | Sequence | PCR size (bp) | Tm. |
|---|---|---|---|
| Mus_Braf_V637E_2F_M13F | GTAAAACGACGGCCAGTTTCCTTTACTTACTGCAC | 290 | 60 |
| Mus_Braf_V637E_R | GCAATTATGCCTGGCTTACA | | |

B

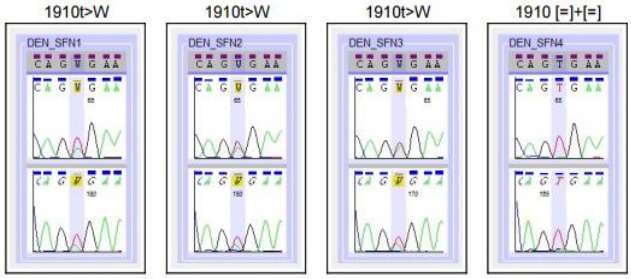



**Supplementary Figure S1. *B-Raf* $^{V637E}$ mutation detected in DEN-induced liver tumors.** Total RNA was extracted from vehicle- or DEN-treated liver tissue with the DNeasy® Blood & Tissue Kit, and converted to cDNA using reverse transcriptase

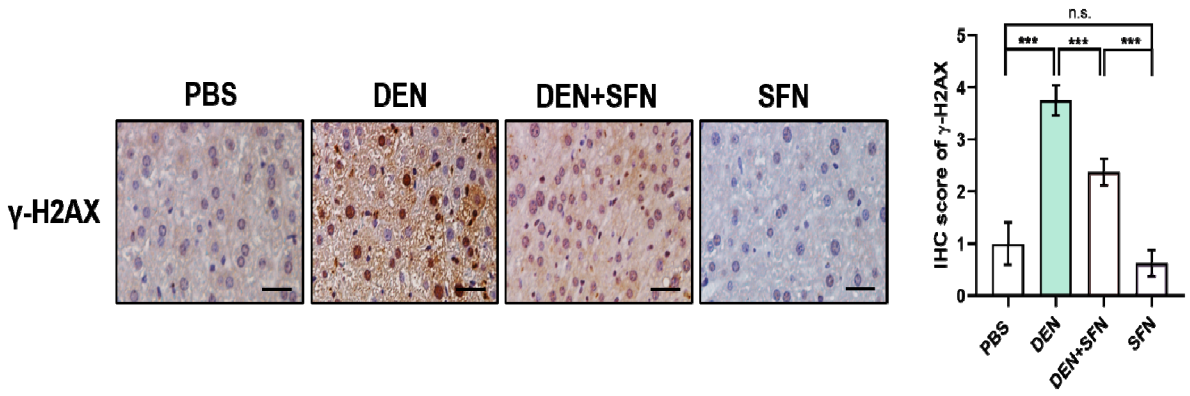
following the standard procedure. The cDNA region bearing murine *B-Raf* gene was amplified using PCR with HiPi Tag polymerase. The PCR products were purified by the QIAquick Purification Kit. **(A)** Designed primers for sequencing are listed, GTAAAACGACGGCCAGT sequence represents M13F primer. **(B)** Sequences of the genetic variants in murine *B-Raf* $^{V637E}$ were detected by capillary electrophoresis.

| Specimen ID | Genotype | Base Position | Genotype Result | User Edit | QV | Base Position Coverage | Amplicon ID | Layer ID | ROI ID | ROI Position | Genotype Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DEN_SFN1 | 1910t>W | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN_SFN2 | 1910t>W | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN_SFN3 | 1910t>W | 1910 | - | no | 65 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |
| DEN_SFN4 | [=]+[=] | 1910 | - | no | 55 | 2X | Mus_Braf_V637E | NP_647455.3 | NP_647455.3_region_1 | 2077 | |

Snippets for Amplicon Mus_Braf_V637E




**Supplementary Figure S2. *B-Raf* $^{V637E}$ mutation detected in SFN-treated DEN-induced liver tumors.** Sequencing was performed and cleaned up with the BigDye® Terminator v3.1 Cycle Sequencing Kit. Sequences were detected and analyzed by ABI PRISM 3730XL Analyzer. Sequences of the genetic variants in murine *B-Raf* $^{V637E}$ were detected by capillary electrophoresis. Three out of 4 cases of *B-Raf* $^{V637E}$ mutation (labelled by yellow color) were detected by capillary electrophoresis in SFN plus DEN-induced liver tumors.




**Supplementary Figure S3. Immunohistochemical analysis of γ-H2AX in DEN-induced murine hepatocarcinogenesis with and without SFN administration.** The paraffin sections of liver tissues were subjected to immunohistochemical staining with an antibody against γ-H2AX. The IHC score was analyzed by the image processing program Image ,J and results are shown as the mean ± SD of 4 samples for each group. ***$p < 0.001$; n.s.: non-significant. Representative images of stained sections are displayed. Scale bar, 100 μm.