**Supplementary Data**

**Supplementary Methods.**

*Inter-tumoral coefficient of variation*. The intertumoral CoV for G*d* and G*l* measured on our MR elastography preclinical platform was calculated from repeated measurements made over 24 hours in tumors from the Th-*MYCN* transgenic mouse model (untreated, n=3), from the GTML*/Trp53KI/KI*transgenic mouse model (untreated, n=1), orthotopic BT-474 xenografts (vehicle control, n=3), orthotopic MDA-MB-231 xenografts (vehicle control, n=7) and subcutaneous SW620 xenografts (vehicle control, n=6, published in (18)).

**Supplementary Table 1.** Summary of the origin, characteristics, provenance and culture conditions of the cell lines implanted intracranially. The prefix luc indicates cells that have been transfected with luciferase for bioluminescence imaging.

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| Cell line | Characteristics | Provenance | Culture conditions |
| luc-MDA-MB-231 LM2–4 | Highly malignant human triple negative breast cancer cells isolated from a lung metastasis | Kindly provided by Dr. R. Kerbel, University of Toronto, Canada | Dulbecco's modified Eagle's medium (Invitrogen, Life Technologies) supplemented with 10% (v/v) foetal bovine serum |
| luc-RG2 | Rat glioma cells | Kindly provided by Dr. D. Crichton, Cancer Research Technology, Glasgow |
| luc-U-87 MG | Human glioblastoma cells | American Type Culture Collection (ATCC, LGC Standards, Teddington, UK), modified to express luciferase by Mr. G. Box, The Institute of Cancer Research |
| luc-D-212 MG | Derived from a pediatric hemispheric giant-cell glioblastoma | Duke University, North Carolina | Serial propagation of subcutaneous xenografts before being established *in vitro* and grown on laminin coated flasks in neural stem cell culture medium RHB-A (StemCells, Cambridge, UK), supplemented with human bFGF (20 ng/mL), human EGF (20 ng/mL), human PDGF-AB (20 ng/mL) (Miltenyi Biotec, Bisley, UK) and heparin (2 ng/mL) (Stem Cell Technologies, Vancouver, Canada) |

**Supplementary Table 2.** Summary of the origin, characteristics, provenance and culture conditions of the cell lines used to propagate orthotopic models of breast and pancreatic cancer. The prefix luc indicates cells that have been transfected with luciferase for bioluminescence imaging.

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| Cell line | Characteristics | Provenance | Culture conditions |
| MDA-MB-231 | highly malignant human triple negative breast cancer cells | ATCC | Dulbecco's modified Eagle's medium (Invitrogen, Life Technologies) supplemented with 10% (v/v) foetal bovine serum |
| luc-MDA-MB-231 LM2–4 | highly malignant human triple negative breast cancer cells isolated from a lung metastasis | Kindly provided by Dr. R. Kerbel, University of Toronto, Canada |
| BT-474 | invasive ductal breast carcinoma cells | ATCC |
| luc-PANC-1 | pancreatic epitheloid carcinoma cells | ATCC |