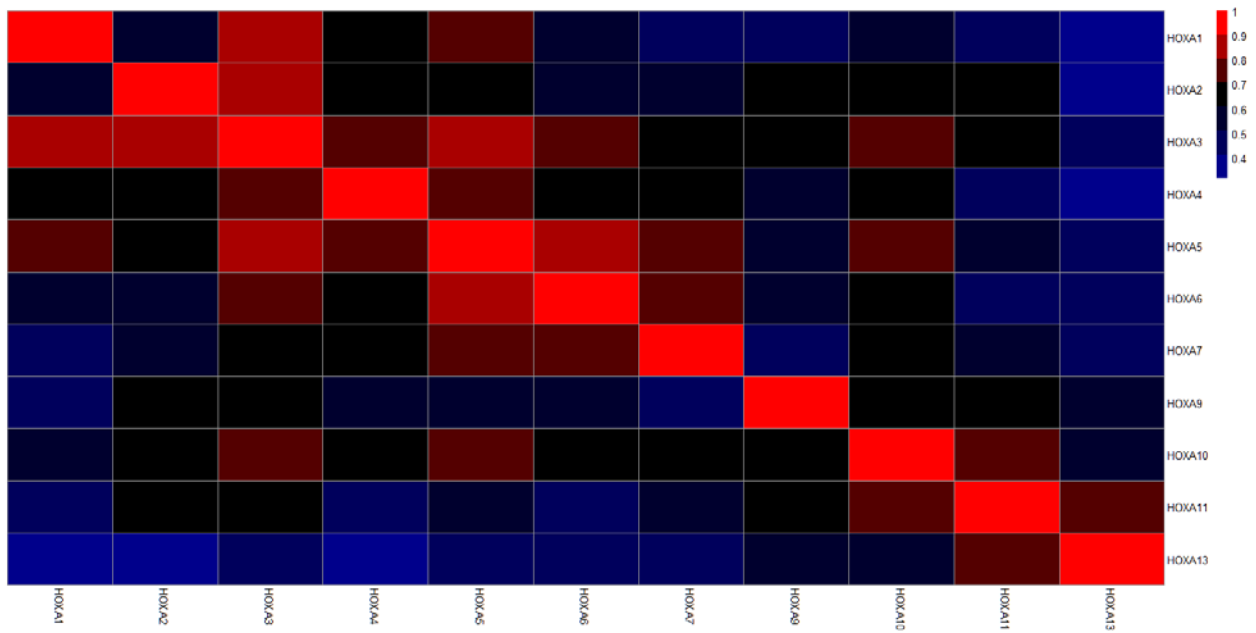
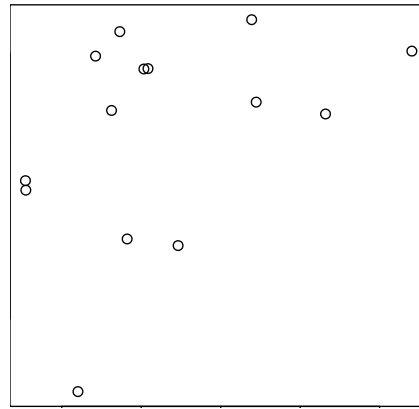
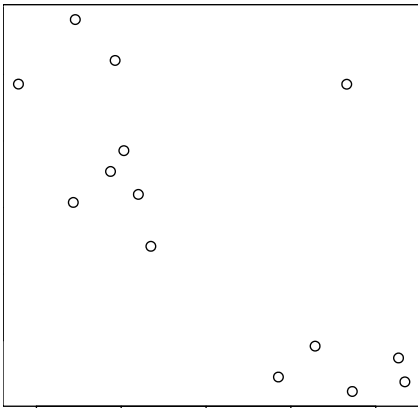


SUPPLEMENTARY MATERIAL

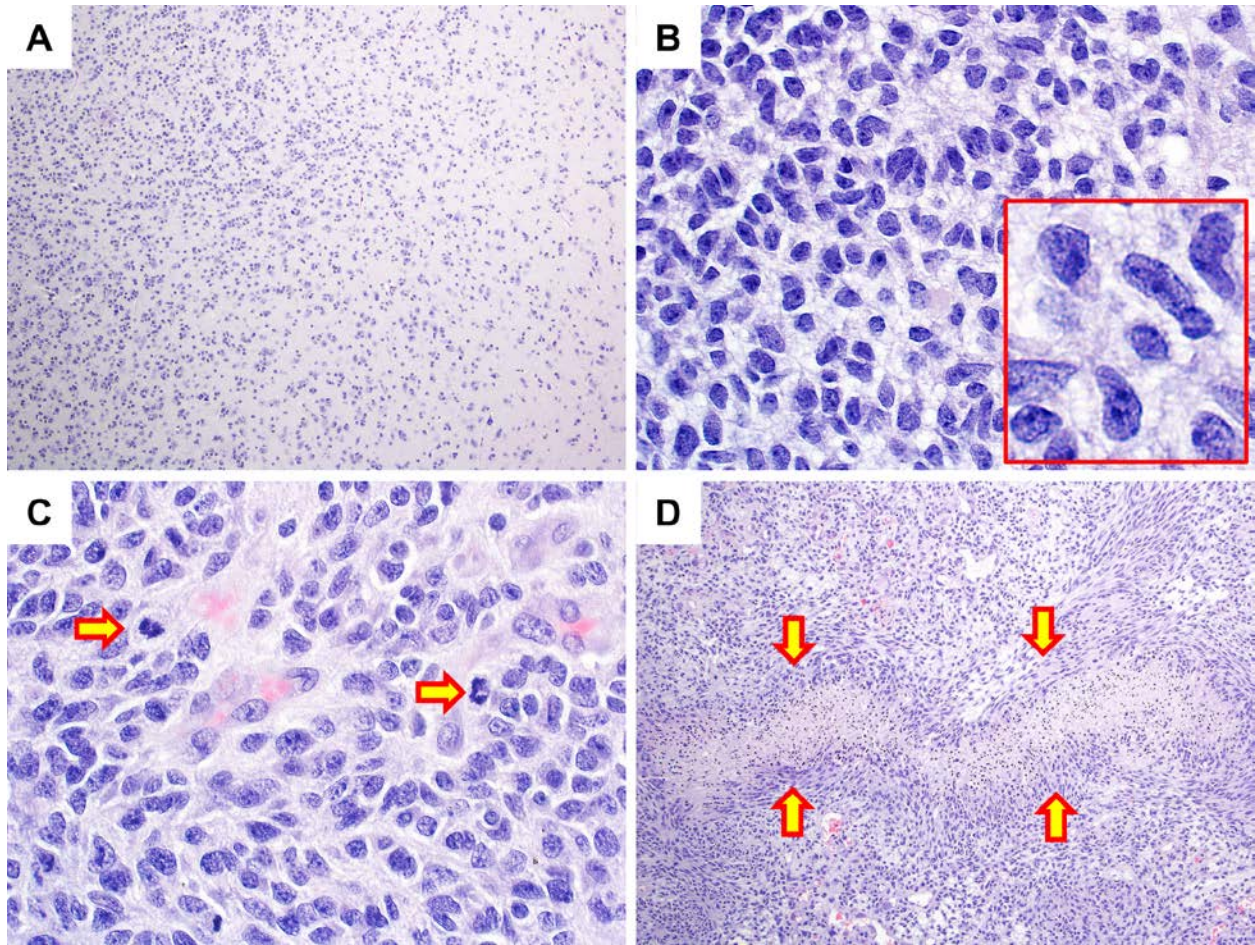
SUPPLEMENTARY FIGURES



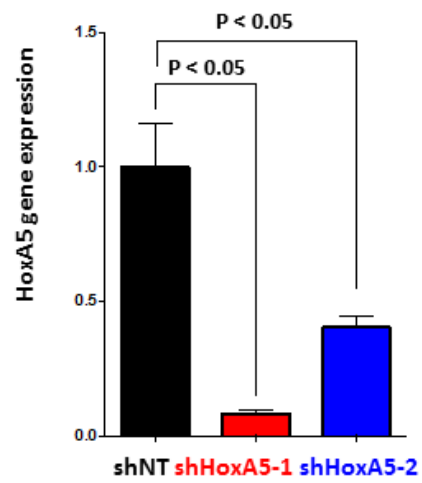
Supplementary Figure 1. Correlation of gene expression across HOXA gene cluster in TCGA glioblastoma dataset.



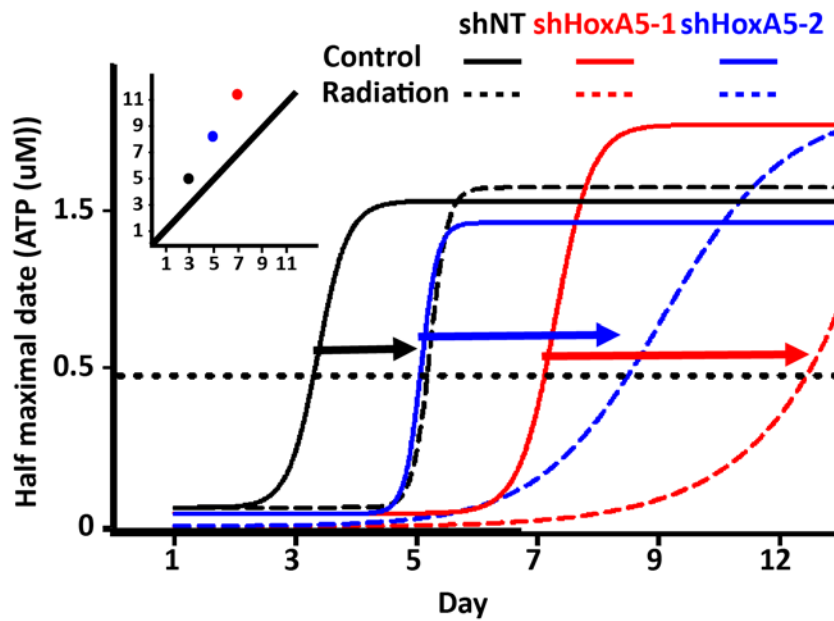
Supplementary Figure 2. *C7orf13* and *RNF32* expression in relation to promoter methylation in proneural glioblastoma.



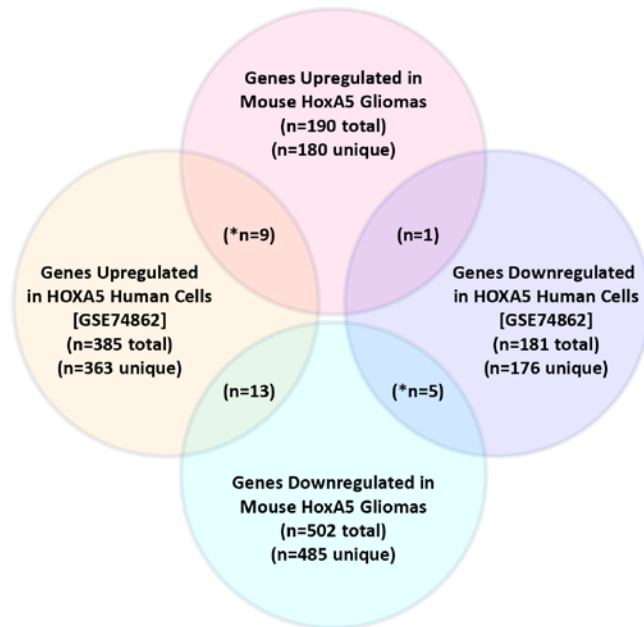
Supplementary Figure 3. Histopathology of HoxA5 RCAS generated glioblastoma in mice. (A) The glioma cells show diffuse infiltration throughout the cortex and white matter. (B) The neoplastic cells have an astrocytic morphology with enlarged, irregular, and hyperchromatic nuclei. High grade features are frequent, including (C) Mitotic figures (arrows) and (D) pseudopalisading necrosis (arrows).



Supplementary Figure 4. Efficacy of HoxA5 shRNA knockdown in isolated PDGF-driven mouse glioblastoma cells *in vitro*.

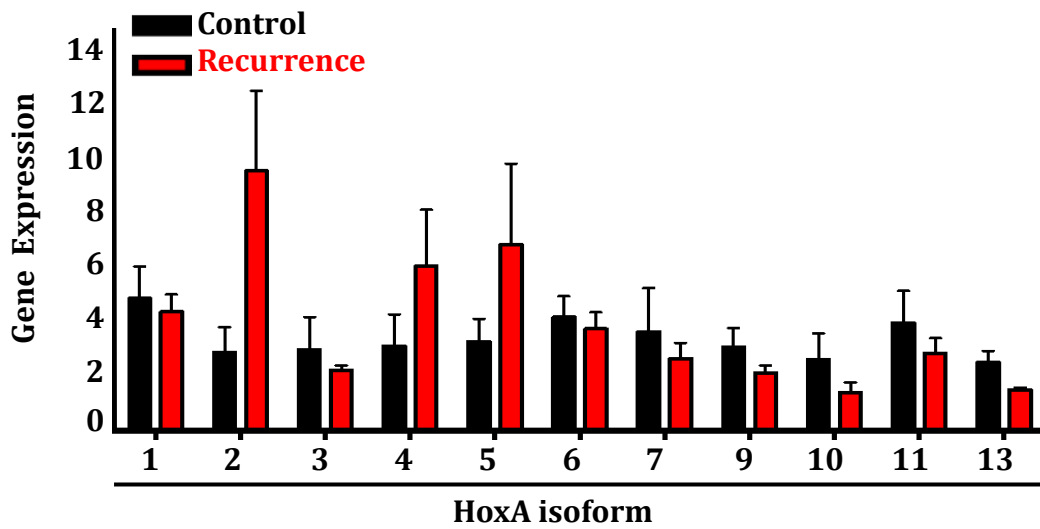


Supplementary Figure 5. The half maximal date of proliferation of each tumor cell type was compared before and after radiation. The inset summarizes the half maximum of the proliferation. The half maximum of each shRNA treatment group without radiation is shown in the x-axis and that with radiation is shown in the y-axis.



| Common Upregulated Genes | Common Downregulated Genes |
|--------------------------|----------------------------|
| <i>BMP7</i> | <i>CAR11</i> |
| <i>FKBP11</i> | <i>CCDC92</i> |
| <i>H2AFX</i> | <i>OGFRL1</i> |
| <i>LUM</i> | <i>PTGDS</i> |
| <i>PDLIM4</i> | <i>RAB26</i> |
| <i>PDLIM5</i> | |
| <i>PHLDA3</i> | |
| <i>RBP1</i> | |
| <i>TNC</i> | |

Supplementary Figure 6. Venn diagram of overlapping and unique significantly expressed genes across HoxA5 overexpressing mouse glioblastoma and human carcinoma cells (GEO dataset GSE74862). Overlapping genes in the same direction are listed in the table to the right.



Supplementary Figure 7. HoxA relative gene expression in PDGF-driven mouse primary and post-radiation recurrent glioblastoma.

SUPPLEMENTARY TABLES

Supplementary Table 1. HOXA genes ranked in association with survival in IDH wildtype glioblastoma

| Symbol | DE.FC | DE.Qval | SA.Qval | hazard.score | rank |
|--------|--------|---------|---------|--------------|------|
| HOXA5 | -2.122 | 0 | 0.003 | 20.121 | 1 |
| HOXA3 | -1.191 | 0.231 | 0.071 | 0.87 | 15 |
| HOXA4 | -2.55 | 0.519 | 0.227 | 0.467 | 25 |
| HOXA1 | -0.326 | 1 | 0.648 | 0 | 65 |
| HOXA2 | -1.288 | 1 | 0.3 | 0 | 65 |
| HOXA6 | -0.273 | 1 | 0.368 | 0 | 65 |
| HOXA7 | -1.078 | 1 | 0.465 | 0 | 65 |
| HOXA9 | -0.795 | 1 | 0.74 | 0 | 65 |
| HOXA10 | -1.133 | 1 | 0.686 | 0 | 65 |
| HOXA11 | -0.131 | 1 | 0.347 | 0 | 65 |
| HOXA13 | -0.804 | 1 | 0.44 | 0 | 65 |

SA.Qval: Gene survival association q-value

DE.Qval: gene differential expression q-values

DE.FC: gene differential expression fold changes

hazard score: $-\log_{10}(\text{SA.Qval}) * -\log_{10}(\text{DE.Qval}) * \log_2(\text{DE.FC})$.

Supplementary Table 2. RT-PCR primer sequences. (h=human target, m=mouse target).

| Gene | Forward | Reverse |
|----------------|------------------------|------------------------|
| mActin | AGCAAGCAGGAGTACGATGAG | AAAACGCAGCTCAGTAACAGT |
| mHoxA1 | TGGCCACGTATAATAACTCC | AAGTGGAACTCCTTCTCCAG |
| mHoxA2 | AGTATCCCTGGATGAAGGAG | AAGCTGAGTGTTGGTGTACG |
| mHoxA3 | AACAAATCTTTCCCTGGATG | CATAGGTAGCGGTTGAAGTG |
| mHoxA4 | CCTGGATGAAGAAGATCCAC | TCTGAAACCAGATCTTGACC |
| mHoxA5 | CTCATTTTGC GGTCGCTATCC | ATCCATGCCATTGTAGCCGTA |
| mHoxA6 | AGCAGCAGTACAAACCTGAC | AGTGGAATTCCTTCTCAAGC |
| mHoxA7 | TCCTACGACCAAAACATCC | AATTCCTTCTCCAGTTCCAG |
| mHoxA9 | TTGTCCCTGACTGACTATGC | AACTCCTTCTCCAGTTCCAG |
| mHoxA10 | CCCTTCAGAAAACAGTAAAGC | TTCACTTGTCTGTCCGTGAG |
| mHoxA11 | GACCCGAGAGCAGCAG | GACGCTTCTCTTTGTTGATG |
| mHoxA13 | AAATGTACTGCCCAAAGAG | GATATCCTCCTCCGTTTGTC |
| hACTIN | AGAAAATCTGGCACCACACC | AGAGGCGTACAGGGATAGCA |
| hP53 | CCCAAGCAATGGATGATTTGA | GGCATTCTGGGAGCTTCATCT |
| hP21 | GGCAGACCAGCATGACAGATT | GCGGATTAGGGCTTCCTCT |
| hPUMA | GACCTCAACGCACAGTACGAG | AGGAGTCCCATGATGAGATTGT |
| hBAX | CCCGAGAGGTCTTTTTCCGAG | CCAGCCCATGATGGTTCTGAT |