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1: [J Neurosurg.](#) 1999 Jun;90(6):1072-7.

**Hormonal effects on glioblastoma multiforme in the nude rat model.**

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OBJECT: The authors studied the effect of gender and hormonal status on survival in nude rats implanted with human glioblastoma multiforme (GBM) cell lines. METHODS: Nude rats received intracerebral implants of either wild-type U87MG cells or U87MG cells transfected with the gene for endothelin-1 (U87/ET-1). In the initial study, survival was compared in males and females for each of the two cell lines. The six second-phase study groups were composed of: 1) males; 2) females; 3) ovariectomized females; 4) sham ovariectomized females; 5) ovariectomized rats given 10 microg/day estradiol benzoate for 21 days; and 6) ovariectomized rats given 20 mg/kg/day progesterone for 21 days. All rats in the second phase were implanted with U87/ET-1 cells. Animals were killed when they exhibited initial signs of neurological deterioration. Female nude rats survived longer than male rats implanted with either U87 or U87/ET-1 cells. In the second phase, ovariectomized, male, and progesterone-treated rats died at approximately 19 days, whereas the female, sham-treated, and estrogen-treated animals died 23 to 25 days after tumor cell implantation.

CONCLUSIONS: The authors demonstrate that female nude rats implanted with human GBM cells have a survival advantage over male rats and that estrogen provides the advantage.

PMID: 10350254 [PubMed - indexed for MEDLINE]

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