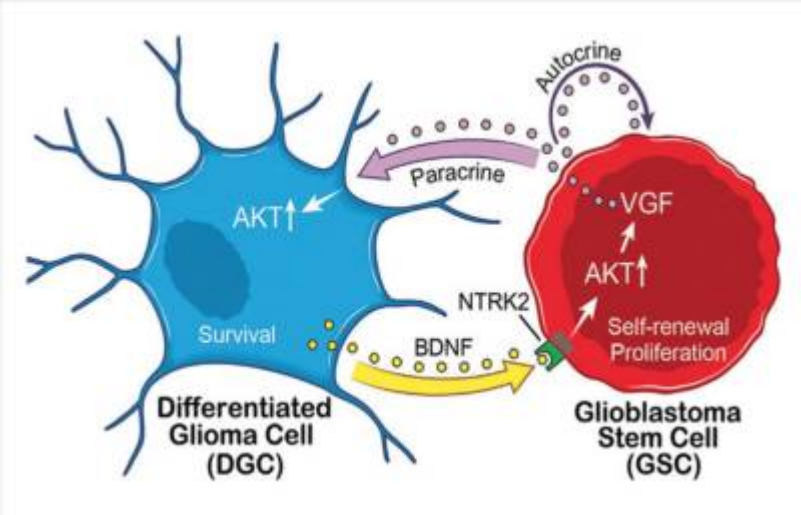
# VGF




VGF or VGF nerve growth factor inducible is a secreted protein and neuropeptide precursor that may play a role in regulating energy homeostasis, metabolism and synaptic plasticity.

The protein was first discovered in 1985 by Levi et al. in an experiment with PC12 cells and its name is non-acronymic. VGF gene encodes a precursor which is divided by proteolysis to polypeptides of different mass, which have a variety of functions, the best studied of which are the roles of TLQP-21 in the control of appetite and inflammation, and TLQP-62 as well as AQEE-30 in regulating depression-like behaviors and memory.

The expression of VGF and VGF-derived peptides is detected in a subset of neurons in the central and peripheral nervous systems and specific populations of endocrine cells in the adenohypophysis, adrenal medulla, gastrointestinal tract, and pancreas.

VGF expression is induced by NGF, CREB and BDNF and regulated by neurotrophin-3.

Physical exercise significantly increases VGF expression in mice hippocampal tissue and upregulates a neurotrophic signaling cascade thought to underlie the action of antidepressants.

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The central part of the median preoptic nucleus (MPNc) is associated with sexual arousal induction in male rats. However, it is largely unclear how males are sexually aroused and achieve their first copulation.

Maejima et al. previously reported that more MPNc neurons activate during the first copulation than the second copulation. In a study, to explore the molecules responsible for sexual arousal induction, they performed DNA microarray of the MPNc in sexually naïve males and males after they copulated for their first and second times. They then performed quantitative PCR analyses to validate the results of the DNA microarray. Six genes were identified. Their expression increased following copulation and was higher in males after they copulated for the first time than after the second time. The genes encode transcription factors (Fos, Nfil3, Nr4a3), a serine/threonine kinase (Sik1), an antioxidant protein (Srxn1), and a neuropeptide precursor VGF (Vgf), which may be the candidate genes responsible for sexual arousal induction. They examined the effects of Vgf knockdown in the MPNc on sexual partner preference and sexual behavior in sexually inexperienced and experienced males to

determine the role of VGF in sexual arousal induction. A preference for estrous female rats was reinforced, and the latency of mount and intromission became short after sexually inexperienced males copulated for the first time. However, Vgf knockdown disrupted these phenomena. Vgf knockdown did not have any significant effect in sexually experienced males. VGF-derived neuropeptides presumably serve as an effector molecule to increase sexual activity following sexual arousal induction [1].

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Wang et al. leveraged transcriptional and epigenetic profiles of matched glioma stem cells (GSCs) and differentiated glioblastoma cells (DGCs), revealing preferential VGF expression by GSCs, which patient-derived tumor models confirmed. VGF serves a dual role in the glioblastoma hierarchy by promoting GSC survival and stemness in vitro and in vivo while also supporting DGC survival and inducing DGC secretion of BDNF. Collectively, these data demonstrate that differentiated glioblastoma cells cooperate with stem-like tumor cells through BDNF-NTRK2-VGF paracrine signaling to promote tumor growth [2].

1)
Maejima S, Abe Y, Yamaguchi S, Musatov S, Ogawa S, Kondo Y, Tsukahara S. VGF in the medial preoptic nucleus increases sexual activity following sexual arousal induction in male rats. Endocrinology. 2018 Oct 26. doi: 10.1210/en.2018-00804. [Epub ahead of print] PubMed PMID: 30371765.
2)
Wang X, Prager BC, Wu Q, Kim LJY, Gimple RC, Shi Y, Yang K, Morton AR, Zhou W, Zhu Z, Obara EAA, Miller TE, Song A, Lai S, Hubert CG, Jin X, Huang Z, Fang X, Dixit D, Tao W, Zhai K, Chen C, Dong Z, Zhang G, Dombrowski SM, Hamerlik P, Mack SC, Bao S, Rich JN. Reciprocal Signaling between Glioblastoma Stem Cells and Differentiated Tumor Cells Promotes Malignant Progression. Cell Stem Cell. 2018 Apr 5;22(4):514-528.e5. doi: 10.1016/j.stem.2018.03.011. PubMed PMID: 29625067; PubMed Central PMCID: PMC5947947.