

**Table S1.** All 61 included articles and their bias

\* Intermediate

<b>Title and author</b>	<b>Year</b>	<b>Review</b>	<b>Bias Type</b>
Li Q. et al. Emerging association between androgen deprivation therapy and male meningioma: significant expression of luteinizing hormone-releasing hormone receptor in male meningioma.	2013	Prostate Cancer Prostatic Disease	Strong
Carroll RS et al. Androgen receptor expression in meningiomas.	1995	Journal of Neurosurgery	Strong
Guevara P. et al. Angiogenesis and expression of estrogen and progesterone receptors as predictive factors for recurrence of meningioma.	2010	Journal of Neurooncology	Strong
Bozdağ M. et al. Association of apparent diffusion coefficient with Ki-67 proliferation index, progesterone-receptor status and various histopathological parameters, and its utility in predicting the high grade in meningiomas.	2021	Acta Radiologica	I*
Tao Y. et al. Clinical features and immunohistochemical expression levels of androgen, estrogen, progesterone and Ki-67 receptors in relationship with gross-total resected meningiomas relapse.	2012	British Journal of Neurosurgery	I*
Battu S. et al. Clinicopathological and molecular characteristics of pediatric meningiomas.	2018	Neuropathology	Strong
Barresi V. et al. Clinicopathological characteristics, hormone receptor status and matrix metallo-proteinase-9 (MMP-9) immunohistochemical expression in spinal meningiomas. Pathol Res Pract.	2012	Pathology research and Practice	Strong
Agaimy A. et al. Comparative study of soft tissue perineurioma and meningioma using a five-marker immunohistochemical panel.	2014	Histopathology	Strong
Telugu RB. et al. Estrogen and progesterone receptor in meningiomas: An immunohistochemical analysis.	2020	Journal of Cancer Research and therapy	I*
Bozzetti C. et al. Estrogen and progesterone receptors in human meningiomas: biochemical and immunocytochemical evaluation.	1995	Surgery Neurology	I*
Carroll RS. et al. Expression of a subset of steroid receptor cofactors is associated with progesterone receptor expression in meningiomas.	2000	Clinical Cancer Research	Strong
Carroll RS et al. Expression of estrogen receptors alpha and beta in human meningiomas.	1999	Journal of Neurooncology	Strong
Mnango L. et al. Expression of Progesterone Receptor and Its Association with Clinicopathological Characteristics in Meningiomas: A Cross-Sectional Study.	2021	World Neurosurgery	I*

Schlegel J. et al. Expression of the c-erbB-2-encoded oncoprotein and progesterone receptor in human meningiomas.	1993	Acta Neuropathologica	Strong
Ihonen K. et al. Female predominance in meningiomas can not be explained by differences in progesterone, estrogen, or androgen receptor expression.	2006	Journal of Neurooncology	I*
Shahin MN. et al. Fertility treatment is associated with multiple meningiomas and younger age at diagnosis.	2019	Journal of Neurooncology	I*
Hirota Y. et al. Gonadotropin-releasing hormone (GnRH) and its receptor in human meningiomas.	2009	Clinical Neurology and Neurosurgery	Strong
Lusis EA. et al. High throughput screening of meningioma biomarkers using a tissue microarray.	2005	Journal of Neurooncology	Strong
Konstantinidou AE. et al. Hormone receptors in non-malignant meningiomas correlate with apoptosis, cell proliferation and recurrence-free survival.	2003	Histopathology	Strong
Perrot-Appianat M. et al. Immunocytochemical study of progesterone receptor in human meningioma	1992	Acta Neurochirurgica	Strong
Boulagnon-Rombi C. et al. Immunohistochemical Approach to the Differential Diagnosis of Meningiomas and Their Mimics.	2017	Journal of Neuropathology	I*
Brandis A. et al. Immunohistochemical detection of female sex hormone receptors in meningiomas: correlation with clinical and histological features.	1993	Neurosurgery	I*
Gursan N. et al. Immunohistochemical detection of progesterone receptors and the correlation with Ki-67 labeling indices in paraffin-embedded sections of meningiomas.	2002	International Journal of Neuroscience	I*
Takei H. et al. Immunohistochemical expression of apoptosis regulating proteins and sex hormone receptors in meningiomas..	2008	Neuropathology	Strong
Leães CGS. et al. Immunohistochemical expression of aromatase and estrogen, androgen and progesterone receptors in normal and neoplastic human meningeal cells.	2010	Neuropathology	I*
Mezmezian MB. et al. Immunohistochemical Expression of Progesterone Receptors in Nonmeningothelial Central Nervous System Tumors.	2017	Applied Immunohistochemistry and Molecular Morphology	I*
Khalid H. et al. Immunohistochemical study of estrogen receptor-related antigen, progesterone and estrogen receptors in human intracranial meningiomas.	1994	Cancer	I*
Ipplikcioglu. et al. Is progesteron receptor status really a prognostic factor for intracranial meningiomas?	2014	Clinical Neurological Neurosurgery	Strong
Heß K. et al. Brain Invasion in Meningiomas-Sex-Associated Differences are not Related to Estrogen- and Progesterone Receptor Expression.	2017	Neurosurgery	Strong
Ülgen E. et al. Meningiomas Display a Specific Immunoexpression Pattern in a Rostrocaudal Gradient: An Analysis of 366 Patients.	2019	World Neurosurgery	I*

Lusis EA. et al. Meningiomas in pregnancy: a clinicopathologic study of 17 cases.	2012	Neurosurgery	Strong
Maiuri F. et al. Meningiomas in Premenopausal Women: Role of the Hormone Related Conditions.	2020	Frontiers in Oncology	I*
Perry A. et al. Merlin, DAL-1, and progesterone receptor expression in clinicopathologic subsets of meningioma: a correlative immunohistochemical study of 175 cases.	2000	Journal of Neuropathology & Experimental Neurology	I*
Ichimura S. et al. Molecular investigation of brain tumors progressing during pregnancy or postpartum period: the association between tumor type, their receptors, and the timing of presentation.	2021	Clinical Neurological Neurosurgery	Strong
Portet S. et al. New Insights into Expression of Hormonal Receptors by Meningiomas.	2020	World Neurosurgery	Strong
Domínguez-Malagón HR. et al. Perineurioma versus meningioma. A multi-institutional immunohistochemical and ultrastructural study.	2021	Ultrastructural Pathology	Strong
Hsu DW. et al. Progesterone and estrogen receptors in meningiomas: prognostic considerations.	1997	Journal of Neurosurgery	Strong
Pravdenkova. et al. Progesterone and estrogen receptors: opposing prognostic indicators in meningiomas.	2006	Journal of Neurosurgery	I*
Carroll RS. et al. Progesterone receptor expression in meningiomas.	1993	Cancer Research	Strong
Kuroi Y. et al. Progesterone Receptor Is Responsible for Benign Biology of Skull Base Meningioma.	2018	World Neurosurgery	I*
Wolfsberger S. et al. Progesterone-receptor index in meningiomas: correlation with clinico-pathological parameters and review of the literature.	2004	Neurosurgery Review	I*
Hua L. et al. Prognostic value of estrogen receptor in WHO Grade III meningioma: a long-term follow-up study from a single institution.	2018	Journal of Neurosurgery	I*
Bouillot P. et al. Quantitative imaging of estrogen and progesterone receptors, estrogen-regulated protein, and growth fraction: immunocytochemical assays in 52 meningiomas. Correlation with clinical and morphological data.	1994	Journal of Neurosurgery	Strong
Abdelzaher E. et al. Recurrence of benign meningiomas: predictive value of proliferative index, BCL2, p53, hormonal receptors and HER2 expression.	2011	British Journal of Neurosurgery	Strong
de Carvalho GTC. et al. Recurrence/Regrowth in Grade I Meningioma: How to Predict?	2020	Frontiers in Oncology	I*
Probst-Cousin S. et al. Secretory meningioma: clinical, histologic, and immunohistochemical findings in 31 cases.	2003	Cancer	Strong
Buhl R. et al. Secretory meningiomas: clinical and immunohistochemical observations.	2001	Neurosurgery	Strong
Baxter DS et al. An audit of immunohistochemical marker patterns in meningioma.	2014	Journal of Clinical Neuroscience	I*

Roser F. The prognostic value of progesterone receptor status in meningiomas.	2004	Journal of Clinical Pathology	I*
Claus EB, Park PJ. Specific genes expressed in association with progesterone receptors in meningioma.	2008	Cancer research	Strong
Smith JS. Sex steroid and growth factor profile of a meningioma associated with pregnancy.	2005	Canadian Journal of Neurological Sciences	Strong
Hatiboglu MA. Sex steroid and epidermal growth factor profile of giant meningiomas associated with pregnancy. Surg Neurol.	2008	Surgical Neurology	Strong
Nagashima, G et al. Immunohistochemical detection of progesterone receptors and the correlation with Ki-67 labeling indices in paraffin-embedded sections of meningiomas.	1995	Neurosurgery	Strong
Schulz, S et al. Immunohistochemical determination of five somatostatin receptors in meningioma reveals frequent overexpression of somatostatin receptor subtype sst2A.	2000	Clinical cancer research : an official journal of the American Association for Cancer Research	Strong
Menke, Joshua R et al. Somatostatin receptor 2a is a more sensitive diagnostic marker of meningioma than epithelial membrane antigen.	2015	Acta neuro pathologica	I*
Körner, Meike et al. Value of immunohistochemistry for somatostatin receptor subtype sst2A in cancer tissues: lessons from the comparison of anti-sst2A antibodies with somatostatin receptor autoradiography.	2005	The American journal of surgical pathology	I*
Lazow, Margot A et al. Immunohistochemical assessment and clinical, histopathologic, and molecular correlates of membranous somatostatin type-2A receptor expression in high-risk pediatric central nervous system tumors.	2022	Frontiers in oncology	I*
Behling, Felix et al. Differences in the expression of SSTR1-5 in meningiomas and its therapeutic potential	2022	Neurosurgical review	I*
Silva, Camila Batista de Oliveira et al. "Expression of somatostatin receptors (SSTR1-SSTR5) in meningiomas and its clinicopathological significance.	2015	International journal of clinical and experimental pathology	Strong
Barresi, V et al. Sstr2A immunohistochemical expression in human meningiomas: is there a correlation with the histological grade, proliferation or microvessel density?	2008	Oncology reports	Strong