

OCT4 is an 18-kDa POU-domain transcription factor encoded by the POU5F1 gene. Also known as OCT3, OTF3, and POU5F1, OCT4 is involved in the initiation, maintenance, and differentiation of pluripotent and germline cells during normal development. It is expressed in mouse and human embryonic stem and germ cells but absent from all differentiated somatic cell types in vitro and in vivo. OCT4 has been detected in primary testicular germ cell tumors with pluripotent potential: seminoma and embryonal carcinoma. We investigated: 1) whether a similar pattern of expression is present in primary intracranial germinomas; and 2) how OCT4 compares with placental alkaline phosphatase (PLAP) in terms of specificity and sensitivity as a potential diagnostic tool. We examined histologic sections from 25 cases of germinoma in which paraffin blocks with sufficient material were available. All cases were reviewed and sections from 32 different blocks were obtained and immunostained for OCT4 and PLAP. Additionally, 49 primary and metastatic brain tumors that may be potentially confused with germinoma, either clinically or histologically, were investigated for OCT4 expression. All but one germinoma were pure (ie, lacking other germ cell components). Intense and often diffuse nuclear staining was detected in 100% of germinomas. PLAP immunoreactivity was detected in 23 of 25 cases and was absent in the remaining 2 cases. The intensity of OCT4 immunostaining was significantly better than that of PLAP. None of the 49 control cases, which included glioblastoma multiforme, pineoblastoma, pituitary neuroendocrine tumor, malignant lymphoma, metastatic melanoma, capillary hemangioblastoma, meningioma, schwannoma, and a variety of metastatic carcinomas showed immunoreactivity for OCT4. Our study demonstrates that OCT4 is a highly specific and sensitive immunohistochemical marker for primary intracranial germinomas. OCT4 should be part of immunoperoxidase staining panels in which germinoma enters the differential diagnosis ¹⁾.

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Hattab EM, Tu PH, Wilson JD, Cheng L. OCT4 immunohistochemistry is superior to placental alkaline phosphatase (PLAP) in the diagnosis of central nervous system germinoma. *Am J Surg Pathol*. 2005 Mar;29(3):368-71. PubMed PMID: 15725806.

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