**Supplemental Table 1. The markers that used in the included literatures.**

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| author | Immunohistochemical markers | |
| Gross et al22 | | HMB-45, desmin, vimentin, CK, EMA, CD21, CD68, myogenin, actin, ckit, CD34, MART-1, PDGFR, S-100 | |
| Lai et al23 | | HMB-45, melan-A, actin | |
| Fu et al24 | | HMB-45, Melan-A, NSE, CD68, S-100, Syn, CgA, AE1/AE3, EMA,CD34, CD117, Dog-1, SMA, desmin, Myo-D1, CD99 | |
| Kapur et al27 | | HMB-45, Melan-A, Mart-1, MITF, cathepsin K, S-100, pankeratin, p63, CK5/6, CK8/18, inhibin, chromogranin, synaptophysin, CD117, WT1, myogenin,desmin, SMA, calretinin | |
| Shi et al26 | | HMB-45, melan A, actin, desmin, CK, vimentin | |
| Baek et al12 | | HMB-45, c-kit, SMA, CK, S-100, vimentin, desmin, chromogranin, synaptophysin, EMA, CD-34 | |
| Yamamoto et al11 | | HMB-45, cyclin D1, Ki-67, S-100 protein, vimentin, CK, EMA, muscle markers, neuroendocrine markers | |
| Cho et al15 | | HMB-45, TFE3, S100, Melan-A, tyrosinase, CK, epithelial membrane antigen, desmin, SMA, CD117, chromogranin, synaptophysin, CD34 | |
| Pisharody et al14 | | HMB-45, S-100, cytokeratin, Desmin, SMA | |
| |  | | --- | | Righi et al13 | | | | HMB-45, tyrosinase, TFE3, S-100, Melan-A, MiTF, caldesmon, muscle-specific actin, calponin, desmin, myogenin, CD31, AE1/AE3, EMA, synaptophysin, chromogranin, α-fetoprotein, vimentin, PAS, Ki-67 | |
| Tanaka et al16 | | gp100, CD68, TFE3, vimentin, Ki-67, CK, desmin, muscle actin, SMA, neurofilament, S100, synaptophysin, RCC, CD10, AMACR, melan-A, MITF, TFEB | |
| Freeman et al18 | | HMB-45, CD-117, desmin, SMA, muscle specific actin, CD-34, vimentin, S-100, CK | |
| Park et al20 | | HMB-45, S-100, actin, desmin | |
| Shi et al17 | | HMB-45, SMA, vimentin, Melan-A, desmin, cytokeratin, CD10, CD117, CD34, synaptophysin (Syn), chromogranin A | |
| Lee et al19 | | HMB-45, TFE3, Ki-67, vimentin, pancytokeratin, SMA, S100, CD117, CD34, synaptophysin, chromogranin, CD10, hepatocyte antigen, CD1a, desmin | |
| Im et al31 | | progesterone receptor, cyclin D1, HMB-45, Ki-67, CK, vimentin, S-100 protein, actin, desmin, EMA, CD34, c-kit | |
| **author** | | **Immunohistochemical markers** | |
| Mitteldorf et al34 | | vimentin, SMA, desmin, melan A, CD56, pan-cytokeratin AE1/AE3, chromogranin A, CD34, CD31, CD117, S100, muscle specific actin, HHF-35, HMB-45 | |
| Waters et al36 | | Melan-A, desmin, Inhibin | |
| Wilson et al37 | | SMA, MiTF, desmin, cathepsin-K, S-100, MART-1, HMB-45, c-kit, DOG-1, pan-keratin, CAM5.2 | |
| Yamada et al35 | | HMB-45, Melan A, MiTF, α-SMA, desmin, HHF-35, h-caldesmon, CD10, MIB-1, TTF-1, Napsin A, EMA, Cam 5.2, AE1/AE3, CD56, chromogranin A, synaptophysin, S-100, TFE3, CD34, c-Kit, CD45, CD68 | |
| Agaimy et al43 | | HMB-45, MART-1, Ki67, CD56, S-100, SMA, vimentin, pan-cytokeratins, EMA, S-100-protein, desmin, h-caldesmon, myoglobin, MyoD1, bcl-2, progesterone receptor, estrogen receptor, leucocyte common antigen, CD21, CD35, CD34, Factor VIII, CD30, CD68, CD1a, CD31 | |
| Unluoglu et al42 | | SMA, HMB-45, Melan-A, CD99, E cadherin, S100, desmin, CD117, CD34, CD31, AE1/3, EMA, CD10, RCC, CD45, chromogranin A, synaptophysin, ER, PR, cerbB2, cyclin D1, CK20, CK5-6, CK19, bcl2, GCDFP15, MFG, TTF1 | |
| |  | | --- | | Lu et al4 | | | | HMB-45, TFE3, pSTAT3, Ki-67, Melan-A, Desmin, Vimentin, SMA, HHF35, S-100, Synaptophysin, Chromogranin A, AE1/AE3, CD34 , CD117, CD10, AMACR,WT-1, ER ,PR, Cyclin D1, P53 | |
| Yanai et al48 | | HMB-45, PgR636, S-100, Cytokeratin (AE1/AE3 and CAM5.2), EMA, vimentin, desmin, SMA, CD34, Melan-A, calretinin, estrogen receptor | |
| Birkhaeuser et al44 | | HMB-45, SMA, desmin, melan-A, vimentin, CD117, CD34, AE1/AE3, C11 S-100, Ki-67 | |
| |  | | --- | | Genevay et al29 | | | | SMA, desmin, HMB-45, melan-A, AE1/AE3, S-100 protein, EMA, CD117, CD34, synaptophysin, chromogranin A, progesterone and oestrogen receptors, CD31, keratins, CD68, neuron-specific enolase, glial fibrillary acidic protein | |
| Scheppach et al45 | | HMB-45, AE1/3, KL1, CD56, melan-A, Synaptophysin, Chromogranin, PanLeu, CD34, CD31, S100, CD117, DOG1, Myogenin, MyoD1, EMA, Actin, Caldesmon, Desmin, CD30 | |
| Mhanna et al38 | | SMA, HMB-45, PNL2, Melan-A, CD99, Ki-67, CK, epithelial membrane antigen, chromogranin A, synaptophysin, S100, CD117 | |
| Banerjee et al39 | | HMB-45, NSE, desmin, SMA, CD34, S100, synaptophysin, CD117, CK, AFP, placental alkaline, PLAP | |
| Chen et al40 | | HMB-45, Melan-A, Actin, Desmin, Ki-67, CD177, CD34, DOG-1, PDGFRa | |
| **author** | | **Immunohistochemical markers** | |
| Narayanaswamy et al41 | | neurofilament protein, synaptophysin, melan-A, HMB45, desmin, SMA, S100, CK, CD117 | |
| Tazelaar et al28 | | HMB-45, vimentin, gp100, HMB-45, S-100, CAM 5.2, MAK 6, AE1/AE3, keratin, epithelial membrane antigen, calcitonin , chromogranin, synaptophysin, leu-7, factor VIII, ulex europeus lectin, actin, desmin, myoglobin, carcinoembryonic antigen, neurofilament | |
| Evert et al30 | | HMB-45, NKI⁄C3, Melan-A, SMA, muscle-specific actin, oestrogen receptor, CD10, desmin, CD117, KBA.62, Keratins, S-100 protein, CD34, progesterone receptor, chromogranin A, EMA, CEA | |
| Ryan et al33 | | HMB-45, progesterone receptor, NSE, cyclin D1, MART-1, S-100, SMA, MSA, caldesmon, desmin, myogenin, vimentin, AE1/AE3, CK8/18, CK7, CK20, EMA, c-kit, chromogranin A, synaptophysin, estrogen receptor, CD34, CD10, PLAP, HCG, AFP, inhibin, CD68 | |
| Kanazawa et al32 | | HMB-45, neuronspecific enolase, CD68,TFE3, Ki-67, AE1/AE3, CAM5.2, epithelial membrane antigen, SMA, desmin, myoD1, caldesmon, calponin, synaptophysin, chromogranin A, NCAM, vimetin, CD34, S-100, melan-A, CD99, CD10, D2-40, CD138, P-ALP, multiple myeloma oncogene-1 | |
| Koutlas et al46 | | HMB-45, MART-1/Melan-A, CD10, SMA, desmin, calponin, estrogen receptors, CD68/KP1, S100, CD34, progesterone receptors | |
| Qu et al49 | | HMB-45, Melan, S-100, Syn, CgA, cytokeratin, vimentin, SMA, actin, CD117, CD34, Ki-67, P53 | |
| Fassan et al47 | | HMB-45, S100, vimentin, Mitf, HHF35, desmin, CD45, CD99, chromogranin, cytokeratins | |
| Issat et al9 | | HMB-45, Melan A , MITF, SMA, caldesmon, desmin, Ki67, | |
| Wejman et al25 | | HMB-45, Vimentin, S-100, SMA, CD10, CD34, CD 117 | |
| Folpe et al21 | | AE1/AE3, desmin, S-100, SMA, HMB-45, Melan A, MiTF , vimentin, TFE3 | |