Brain Biopsy

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**Surgical technique, perioperative care**– [see p. Op310 >>](HTTP://WWW.NEUROSURGERYRESIDENT.NET/Op.%20Operative%20Techniques/300-399.%20Cranial/Op310.%20Brain%20Biopsy.pdf)

Tissue processing techniques

| **Evaluation** | **Technique** | **Fixative** | **Staining** |
| --- | --- | --- | --- |
| Cytological | Imprint/touch | Alcohol | Rapid H & E,  Diff-Quik Papanicolaou |
| Smear/squash |
| Routine histological | Frozen section | Alcohol | Rapid H & E,  metachrome B, special staining |
| Paraffin section | Formalin, B5 |
| Special histological: histochemistry, immunohistochemistry | Frozen section | None | Enzymes, biochemical reactions |
| Frozen or paraffin | Variable | Mono- or poly-clonal antibodies |
| Electron microscopy | Thick section | Glutaraldehyde/OsO4 | Toluidine blue |
| Thin section | Lead citrate/uranyl acetate |

Frozen sections:

* + - may provide ***specific diagnosis*** in some cases (but in many situations definitive diagnosis can be made only after evaluation of all tissue specimens and with adjunctive studies).
    - sometimes used to ***guide resection*** of mass lesion.

Ancillary studies:

* + - 1. microbiology (e.g. bacterial, viral, fungal cultures)
      2. cytogenetics (e.g. karyotype analysis)
      3. molecular genetics (e.g. PCR)
      4. biochemical analyses.

Findings

Inclusions, Bodies

eosinophilic

basophilic

electron microscopy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Disease** | **Inclusion name** | **Photo** | **Location (in cell)** | **Cells affected** | **Contents** |
| Parkinson disease  [see p. Mov10 >>](http://www.neurosurgeryresident.net/Mov.%20Movement%20disorders,%20Ataxias\Mov10.%20Hypokinetic%20Disorders%201%20(Parkinsonism).pdf#MICROSCOPY) | Lewy bodies |  | cytoplasm | neurons | ***neurofilament***, ***tubulin***, ***α-synuclein*** and ***ubiquitin*** |
| Pick disease (frontotemporal dementia) [see p. S11 >>](http://www.neurosurgeryresident.net/S.%20Symptoms,%20Signs,%20Syndromes\S10-15.%20Dementia,%20Delirium\S11.%20Cortical%20Dementias%20(Alzheimer,%20Pick).pdf#MICROSCOPY) | Pick bodies |  | cytoplasm | neurons |  |
| Alzheimer disease  [see p. S11 >>](http://www.neurosurgeryresident.net/S.%20Symptoms,%20Signs,%20Syndromes\S10-15.%20Dementia,%20Delirium\S11.%20Cortical%20Dementias%20(Alzheimer,%20Pick).pdf#NEUROFIBRILLARY_TANGLES) | Neurofibrillary tangles |  | cytoplasm | neurons | **tau protein** |
| Normal aging, neurodegenerative disorders (Alzheimer's disease, Pick disease, Creutzfeldt-Jakob disease) | Hirano bodies |  | cytoplasm | neurons | ***actin*** and actin-related proteins; no ubiquitin! |
| Normal aging, neurodegenerative disorders (Alzheimer's disease) | Simchowicz bodies (granulovacuolar degeneration) |  | cytoplasm |  | unknown composition |
| ALS  [see p. Spin21 >>](http://www.neurosurgeryresident.net/Spin.%20Spinal%20Disorders\Spin21.%20UMN%20and%20LMN%20disease%20(ALS).pdf#Bunina_bodies) | Bunina bodies |  | cytoplasm | neurons | unknown composition |
| Familial myoclonic epilepsy | Lafora bodies |  | cytoplasm | neurons |  |
| Senile degenerative process | Corpora amylacea | H&E:  PAS: |  |  |  |
| Age-associated degen. changes in substantia nigra | Marinesco bodies |  | cytoplasm | neurons | **ubiquitin?** |
| Meningioma | Psammoma bodies |  |  |  |  |
| Schwannoma | Verocay body |  | extracellular | |  |
| Neuronal ceroid lipofuscinosis (s. cerebral sphingolipidosis) | Fingerprint bodies |  |  |  |  |
| Lysosomal storage disorder, mucopolysaccharidoses I, II and III | Zebra bodies |  |  |  |  |
| HSV, VZV | Cowdry type A |  | nucleus | neurons and glia |  |
| CMV | “owl-eyes” |  |  |  |  |
| Rabies  [see p. 262 (2a) >>](http://www.neurosurgeryresident.net/USMLE%202\Infection%20(201-300)\262%20(2a).%20Rabies.pdf#Negri_bodies) | Negri bodies |  | cytoplasm | neurons |  |
| Neurosecretory granules in dilated | Herring bodies |  | terminal axons of neurohypophysis | neurons |  |
| Artifact of formalin fixation | Buscaino bodies |  |  |  |  |

Bibliography for “Brain Biopsy” → follow this [link >>](http://www.neurosurgeryresident.net/Onc.%20Oncology\Onc.%20Bibliography.pdf)

[Viktor’s Notes℠ for the Neurosurgery Resident](http://www.neurosurgeryresident.net/)

[Please visit website at www.NeurosurgeryResident.net](http://www.neurosurgeryresident.net)