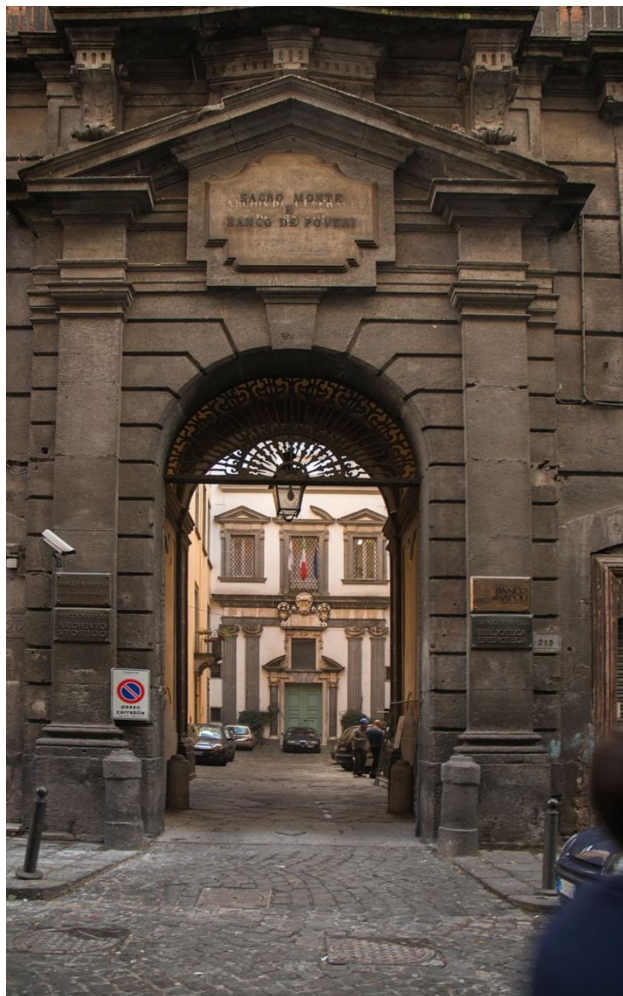


Head & Neck Cytopathology



Pio Zeppa MD, Ph.D
Faculty of Medicine and Surgery
University of Salerno, Italy

Perchè il registro dei tumori



Dai numeri la verità
Eduardo Nappi

Luogo, Editore, Napoli, 2010

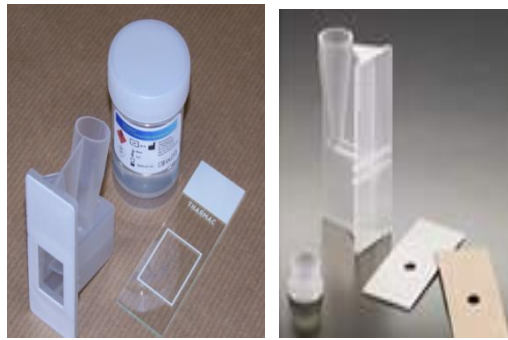
Head and neck pathology (H&N)

- wide variety of inflammatory and neoplastic lesions arising from bones, muscles, vessels, nerves, salivary and lachrymal glands, nose, mouth, pharynx, teeth, tongue....
- anatomical contexts and variety of lesions confer specificity and uniqueness to H&N pathology
- Fine-needle cytology has an important role in H&N diagnoses moreover.....

There is More than Meet the Eyes in Head and Neck Cytopathology

Carlos W. M. Bedrossian, M.D., Ph.D. (HON), FIAC

Head neck cytology and ancillary techniques



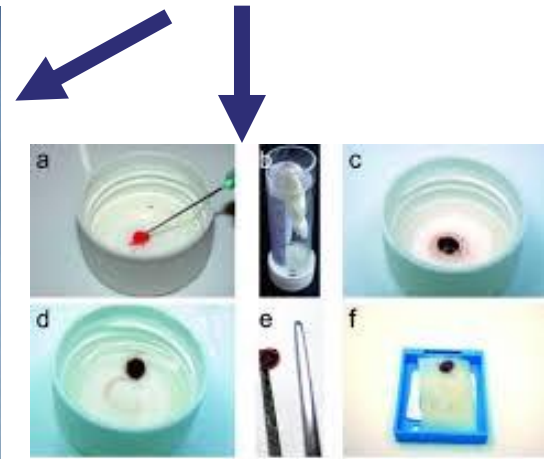
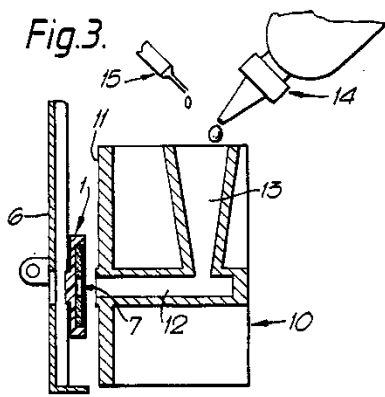
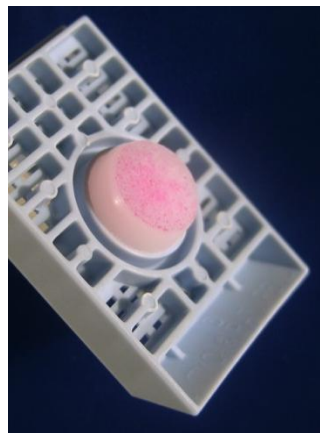
Fluid, epithelial tumors:
additional smears, cell suspension, cytopins, thin layer



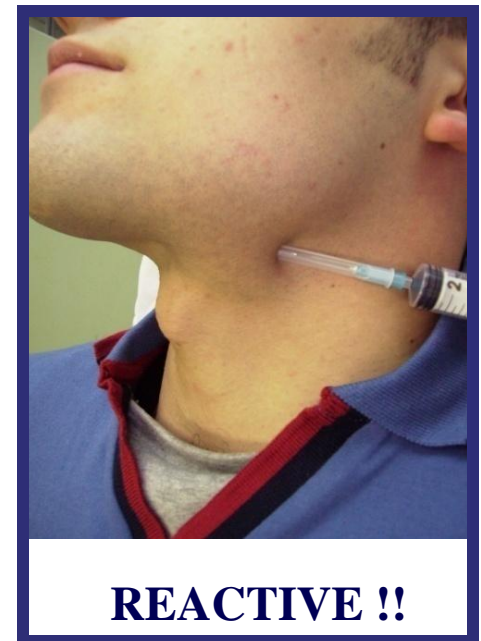
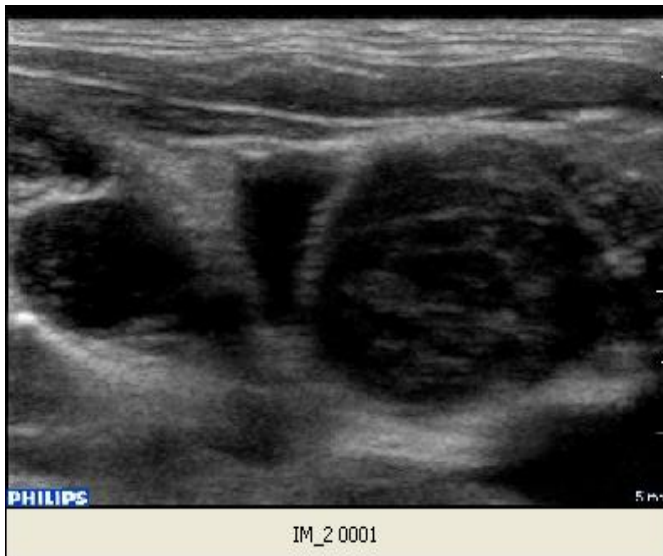
Diff Quik



dense, fragments, mesenchymal tumors:
additional smears, cell blocks

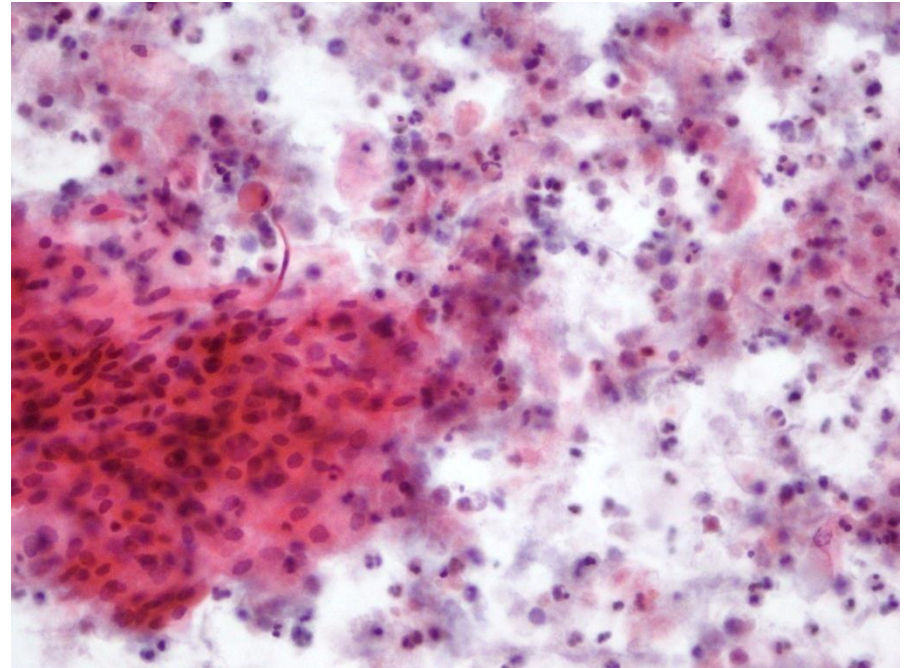
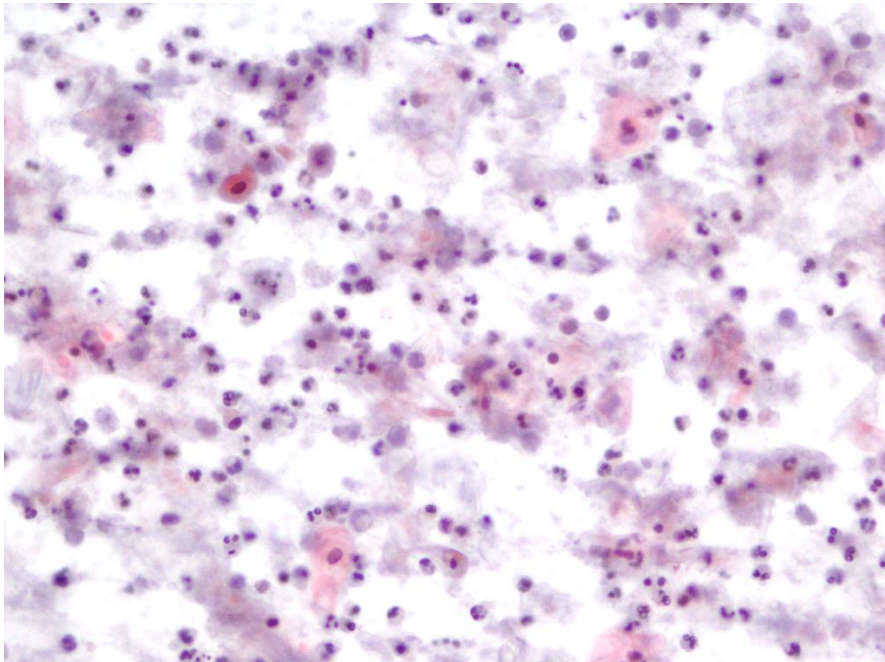


Why cytology for head and neck lymph lesions?

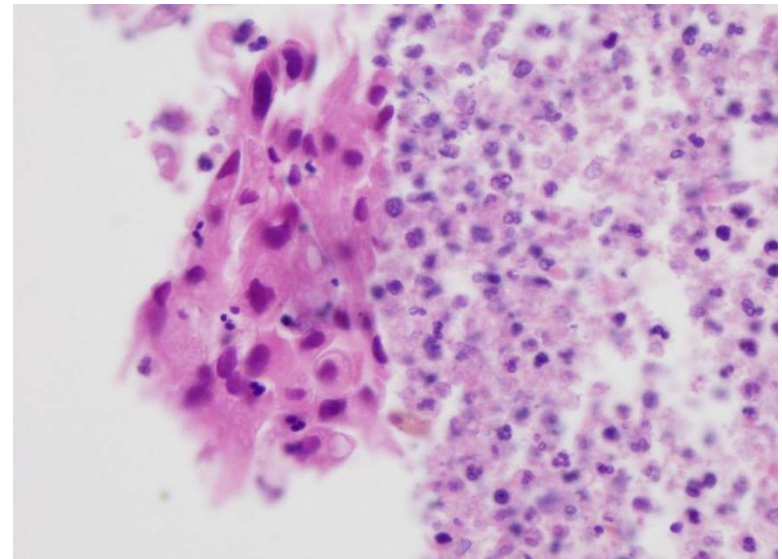
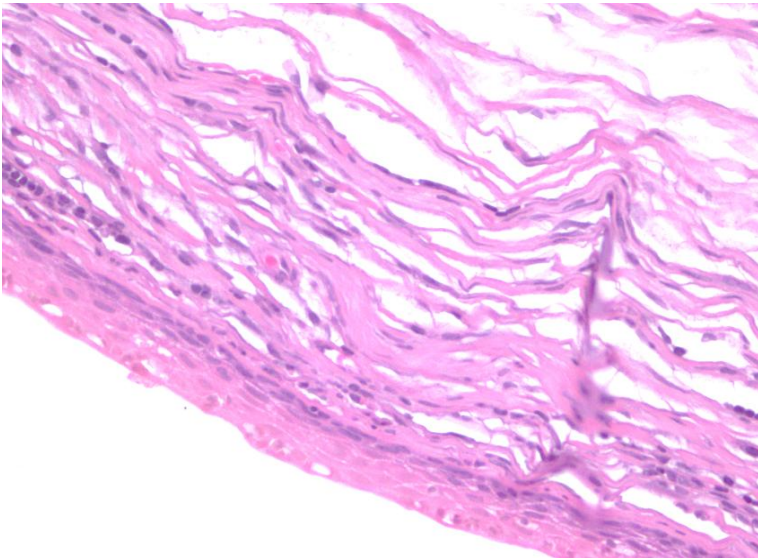
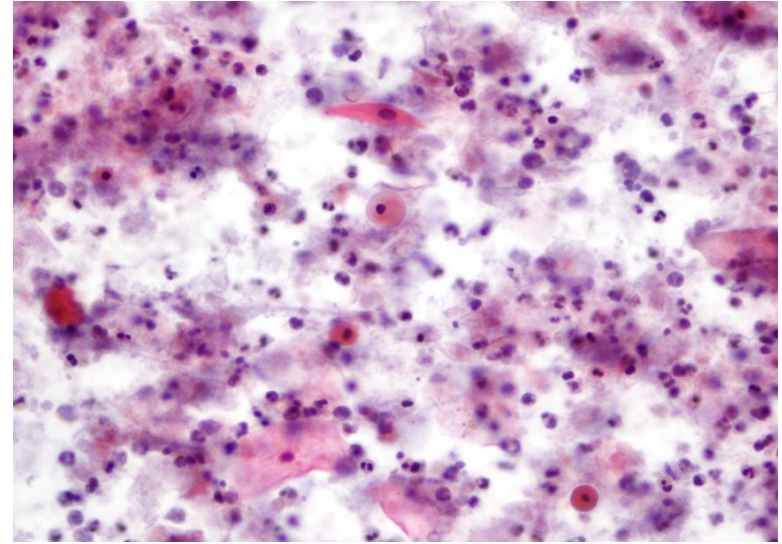
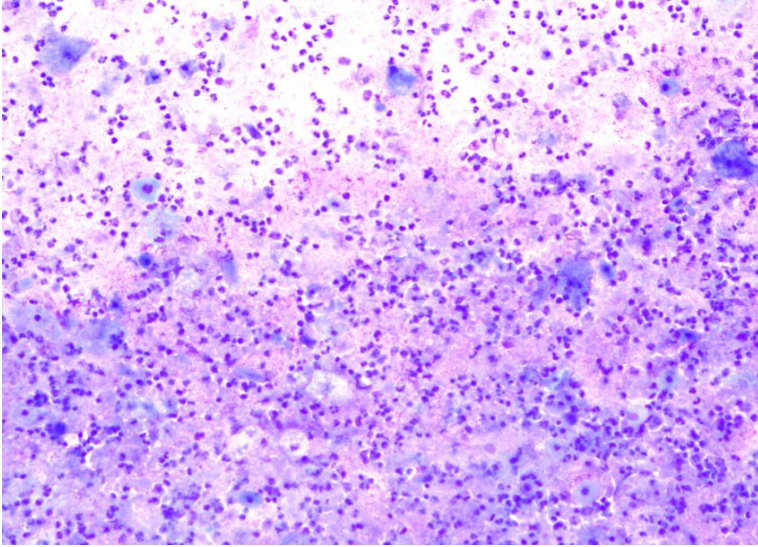


Branchial cysts

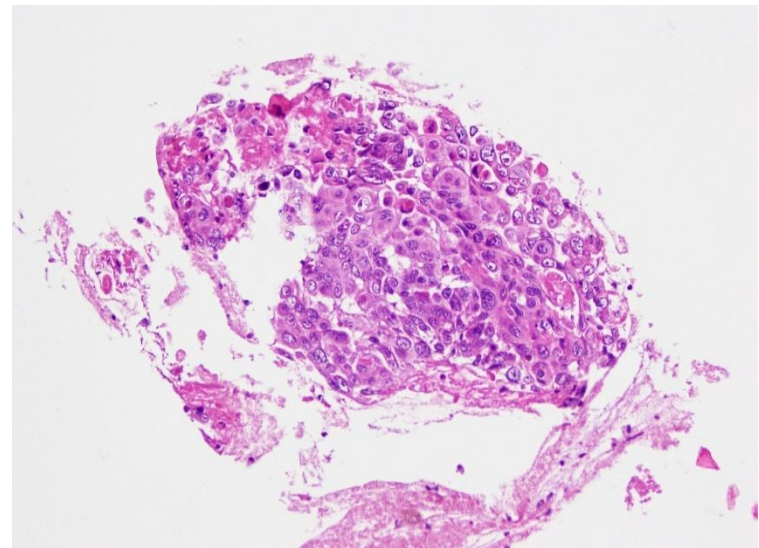
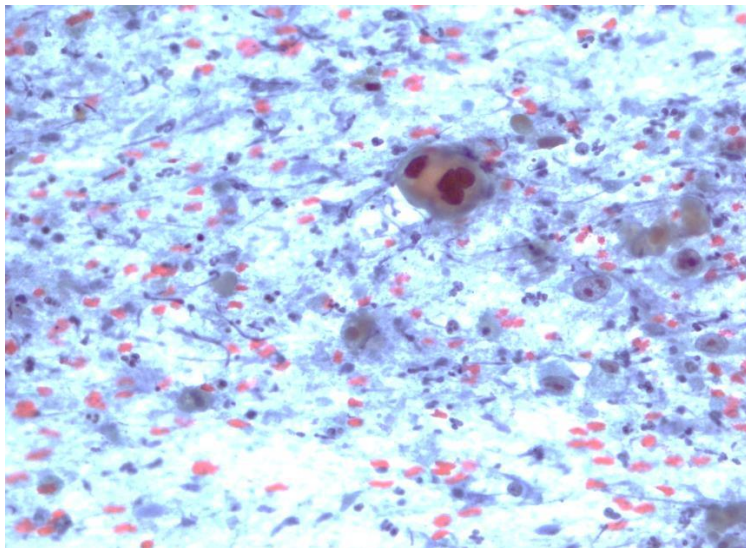
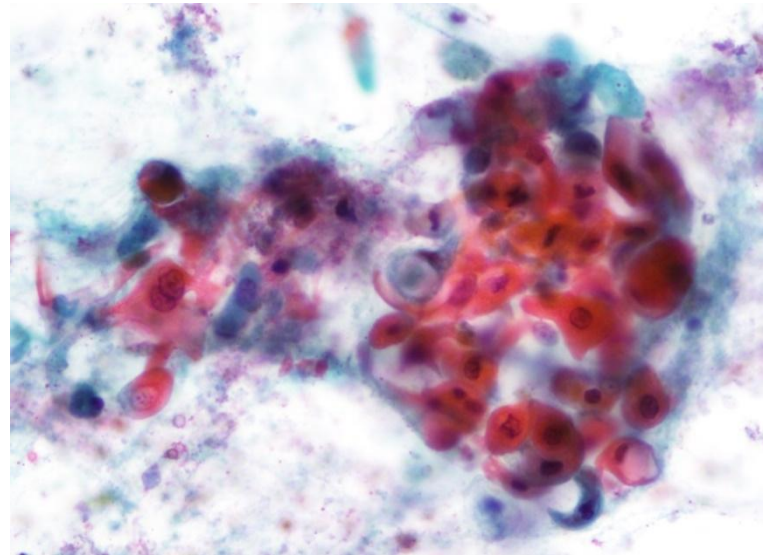
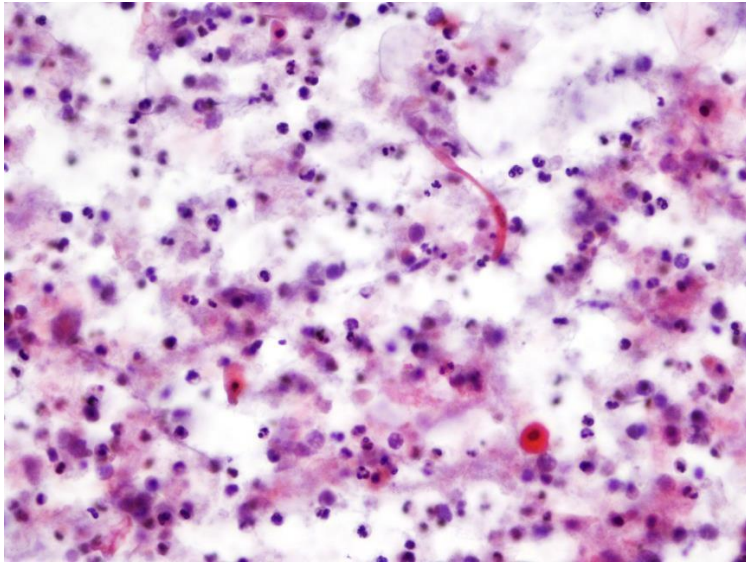
congenital epithelial cysts arise on the neck due to failure of obliteration of the second branchial cleft or failure of fusion of the second and third branchial arches in embryonic development



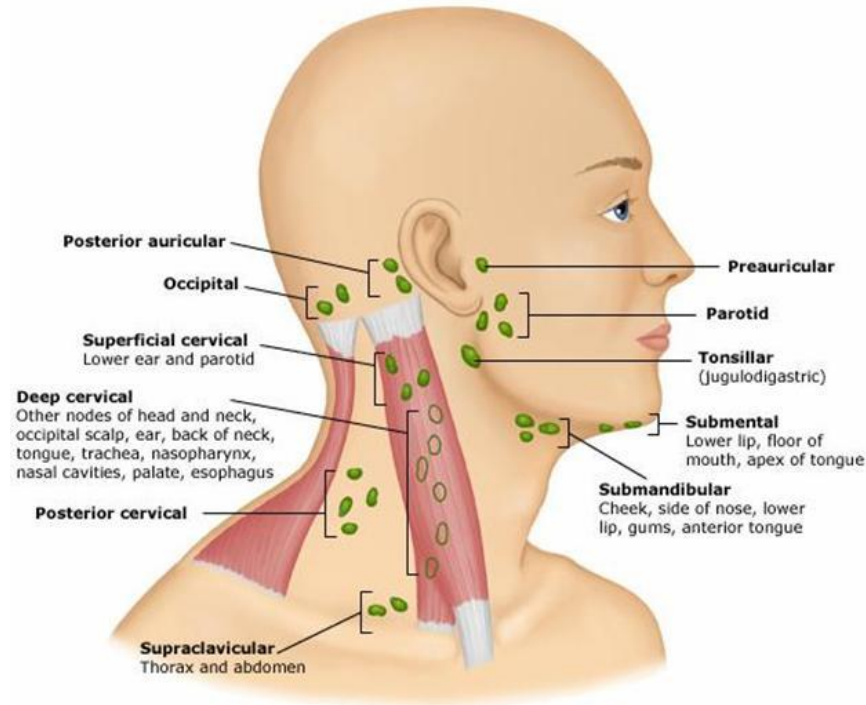
Branchial cysts



Brachial cysts vs cystic squamous cell carcinoma

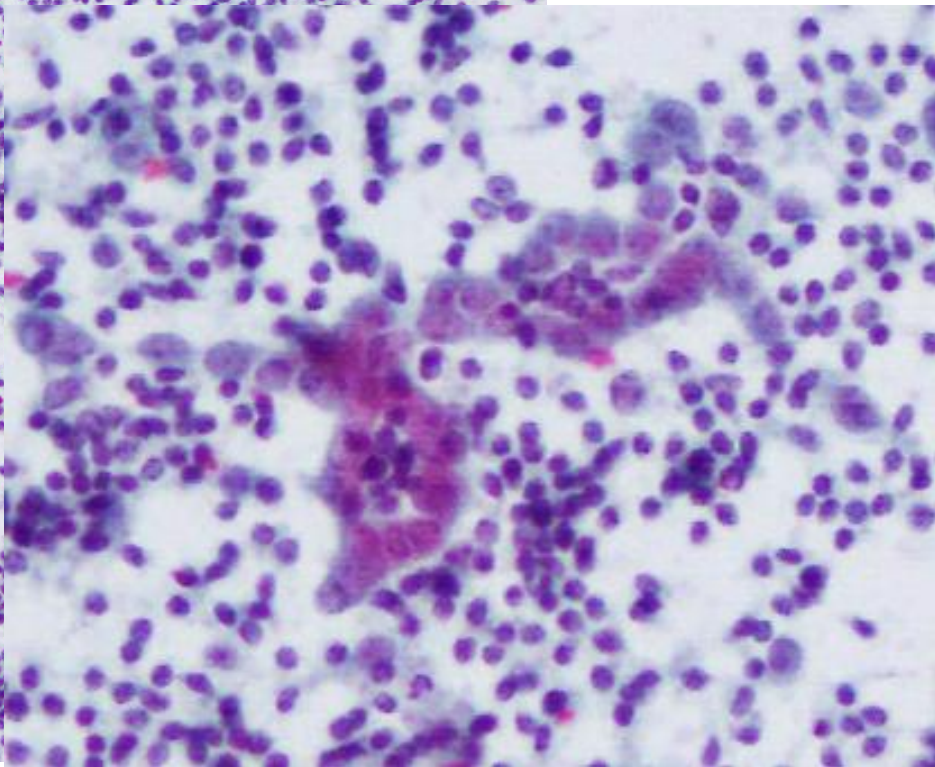
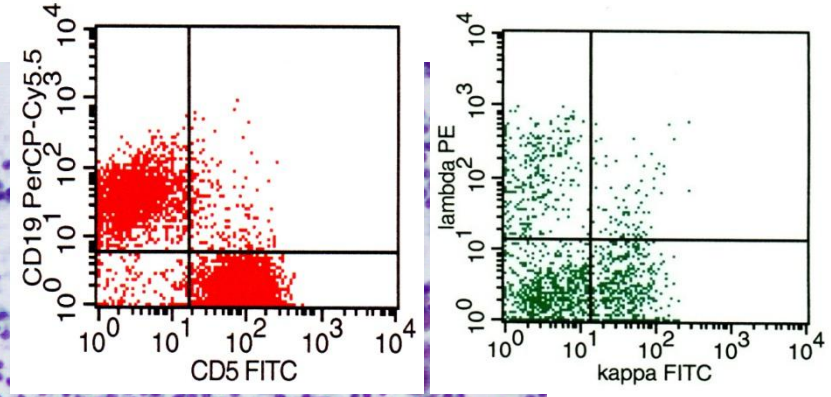
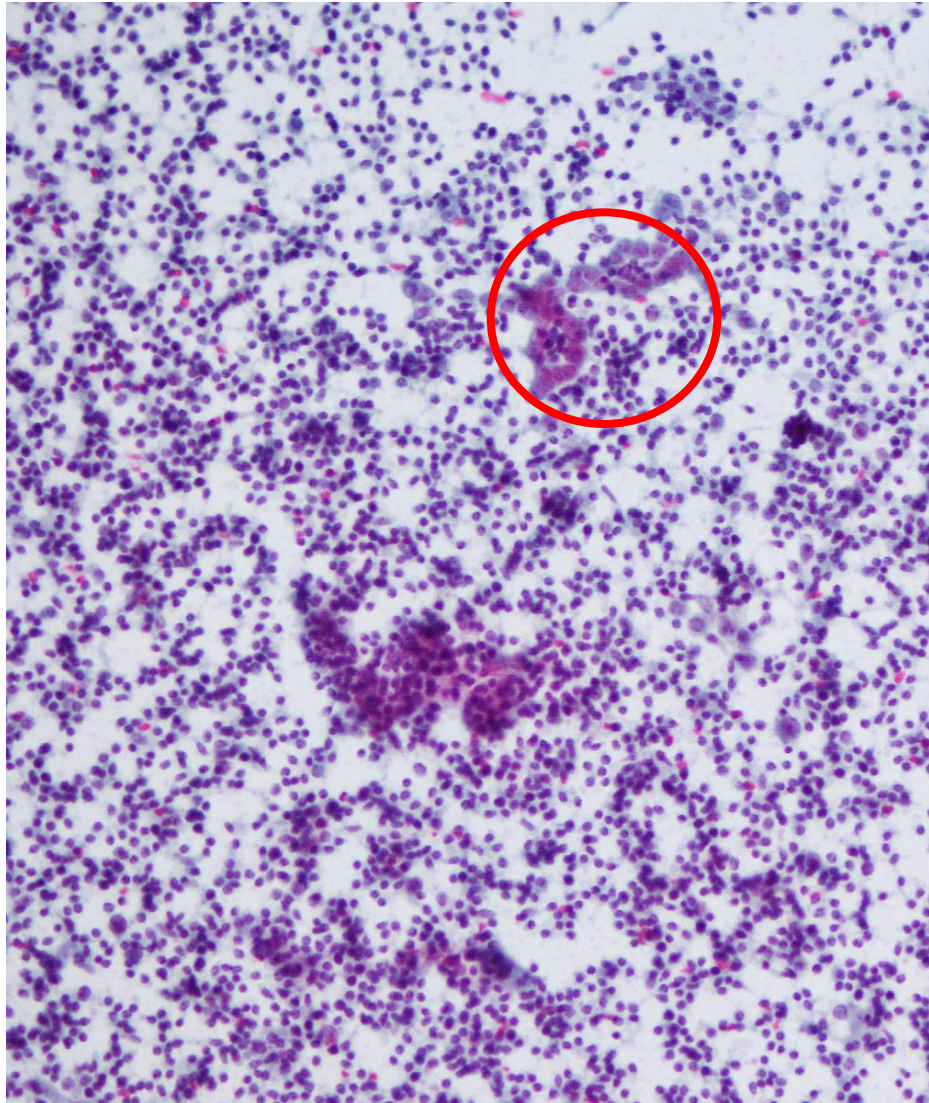


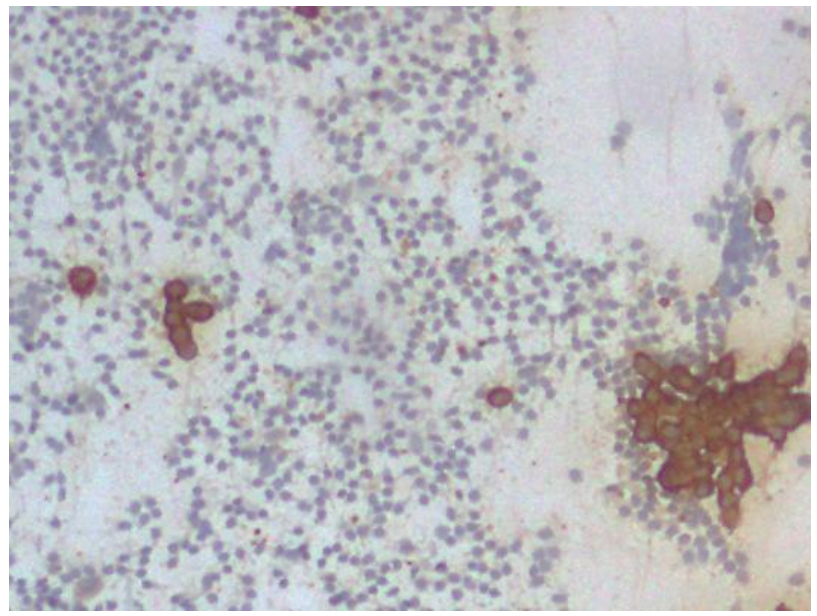
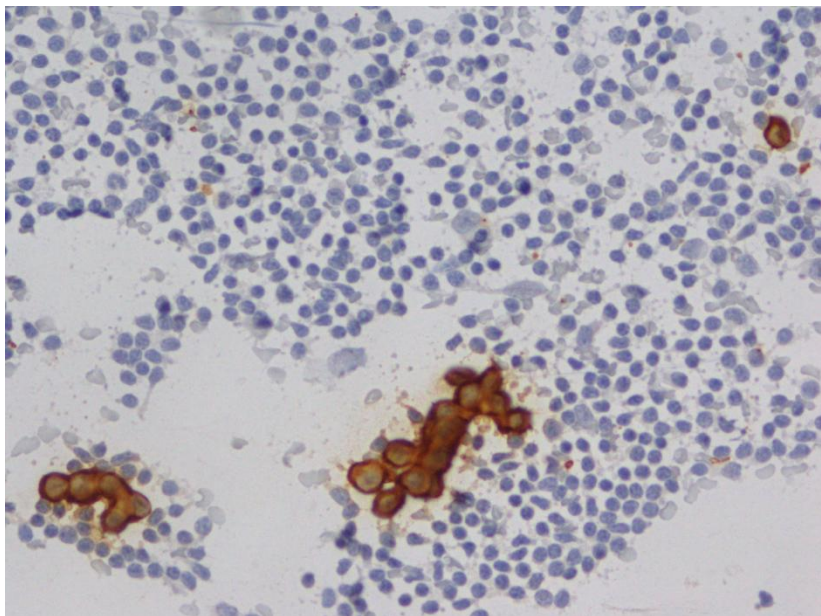
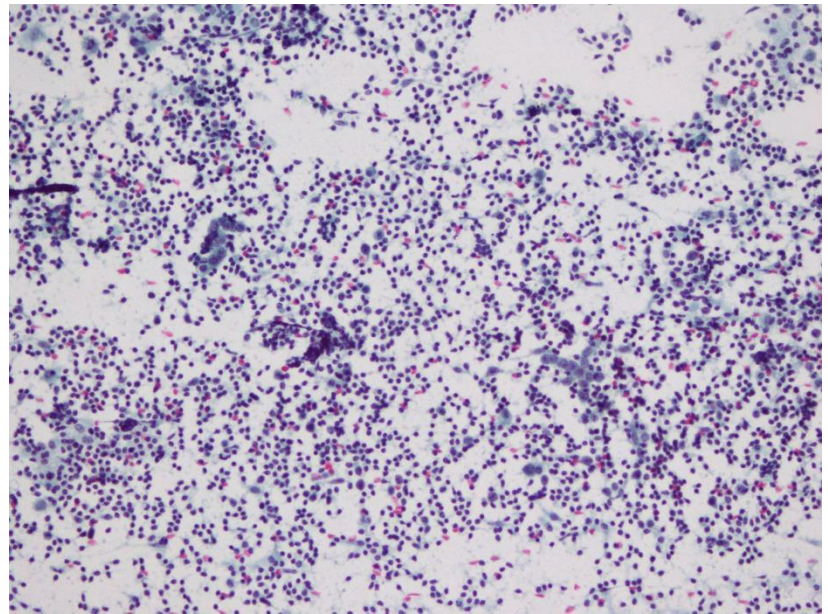
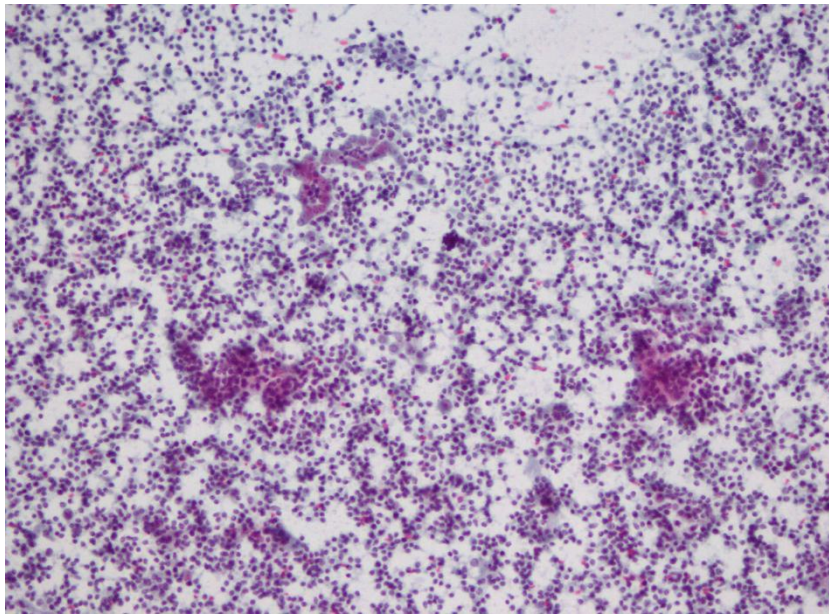
lymph nodes metastases and primary tumors

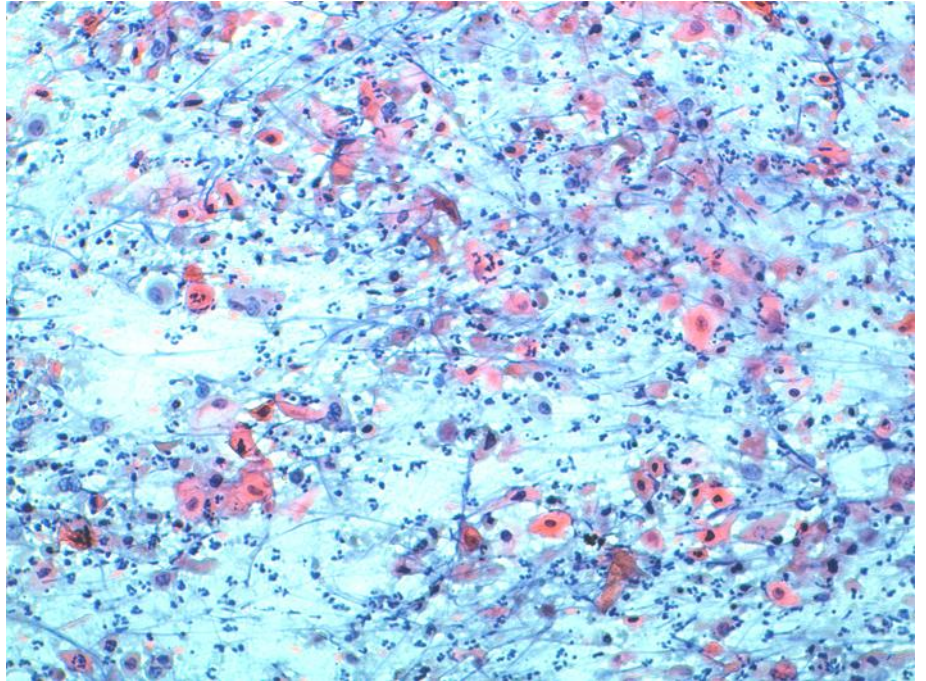
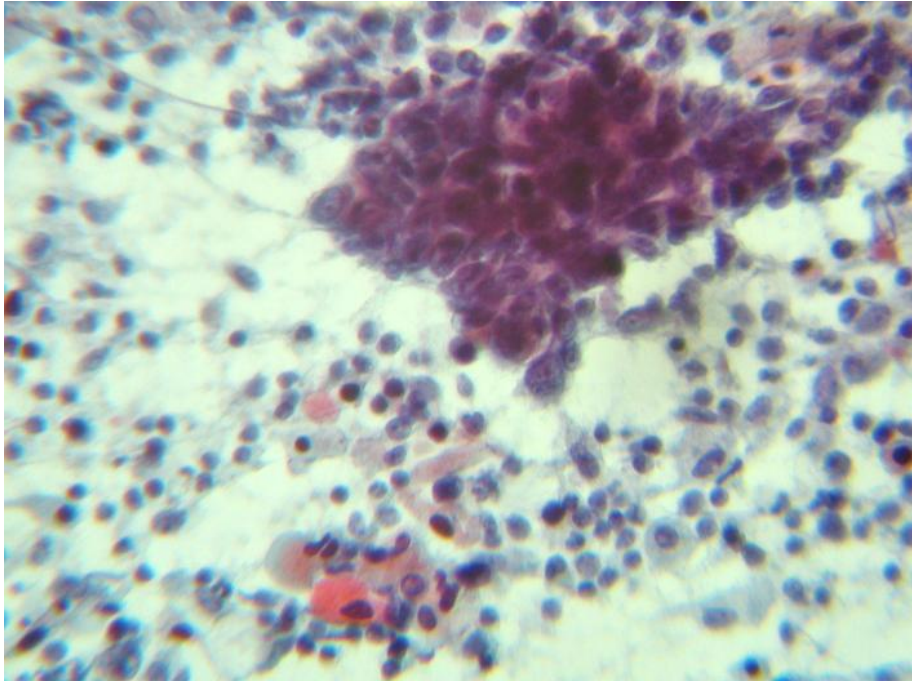


| Level | Involved neck lymph nodes | Possible primary sites |
|-------|-------------------------------|--|
| • I | Submandibular | Mouth floor, lips, anterior |
| • II | Jugulodigastric/upper jugular | Epipharynx, base of tongue, tonsils, nasopharynx, larynx |
| • III | Middle jugular | supraglottic larynx, pyriform sinus |
| • IV | Inferior jugular | Hypopharynx, subglottic pharynx, thyroid, esophagus |
| • V | Supraclavicular | Lungs, thyroid, breast, gastrointestinal system |

female, 45yrs: 16mm, oval, right cervical lymph node, FC negative



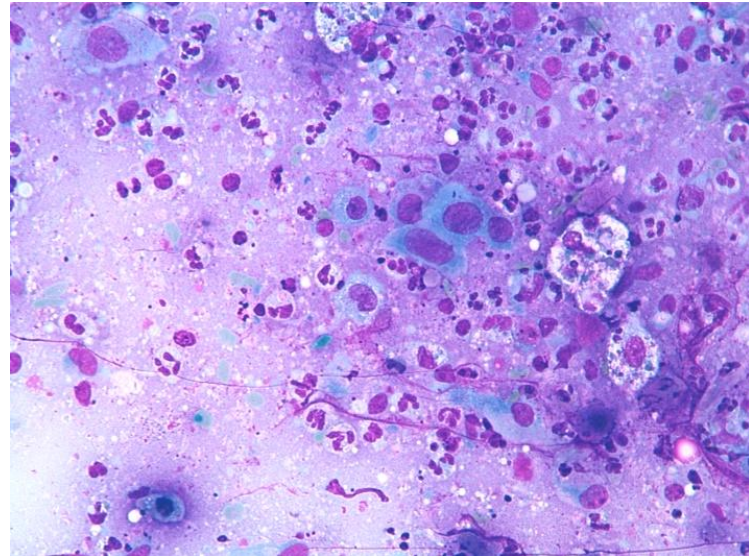
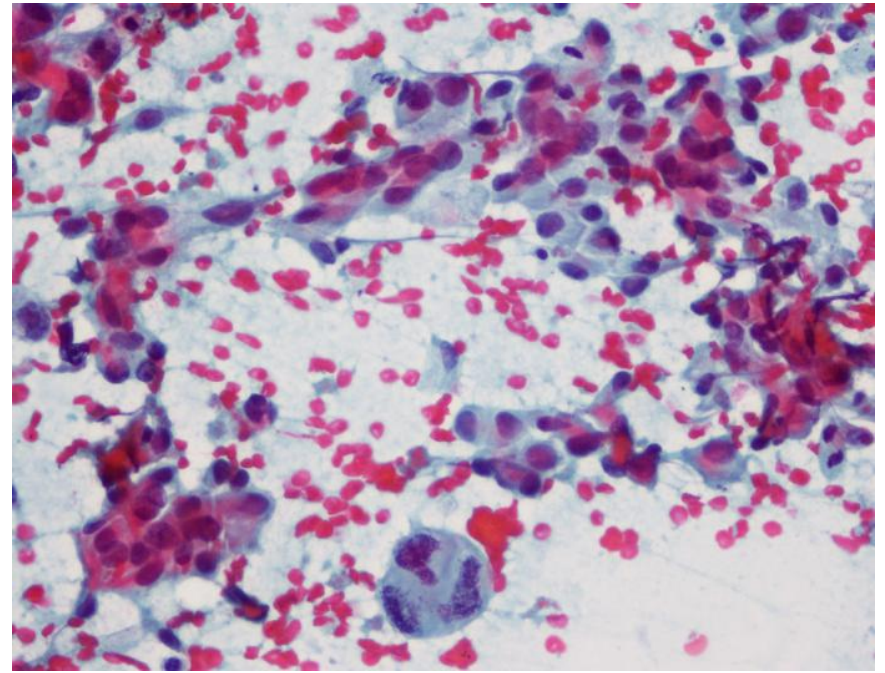
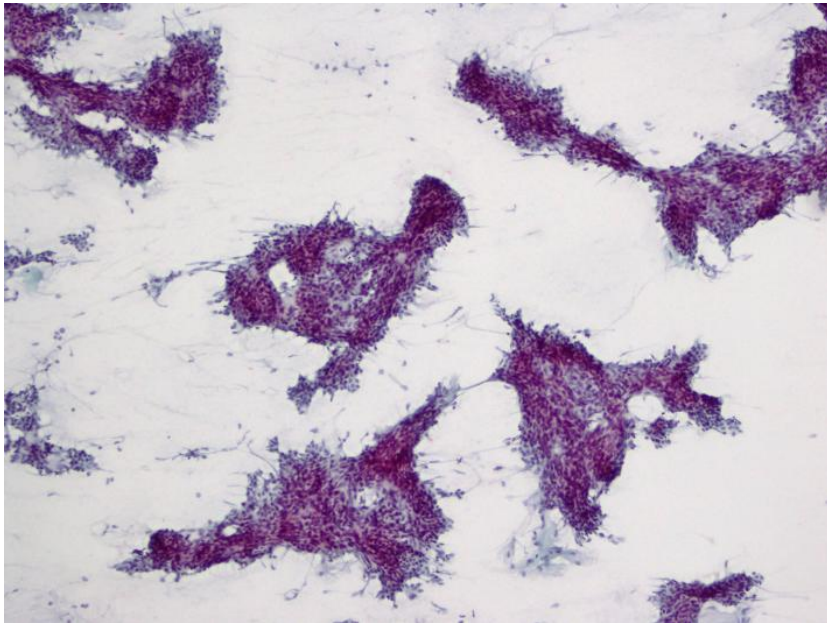




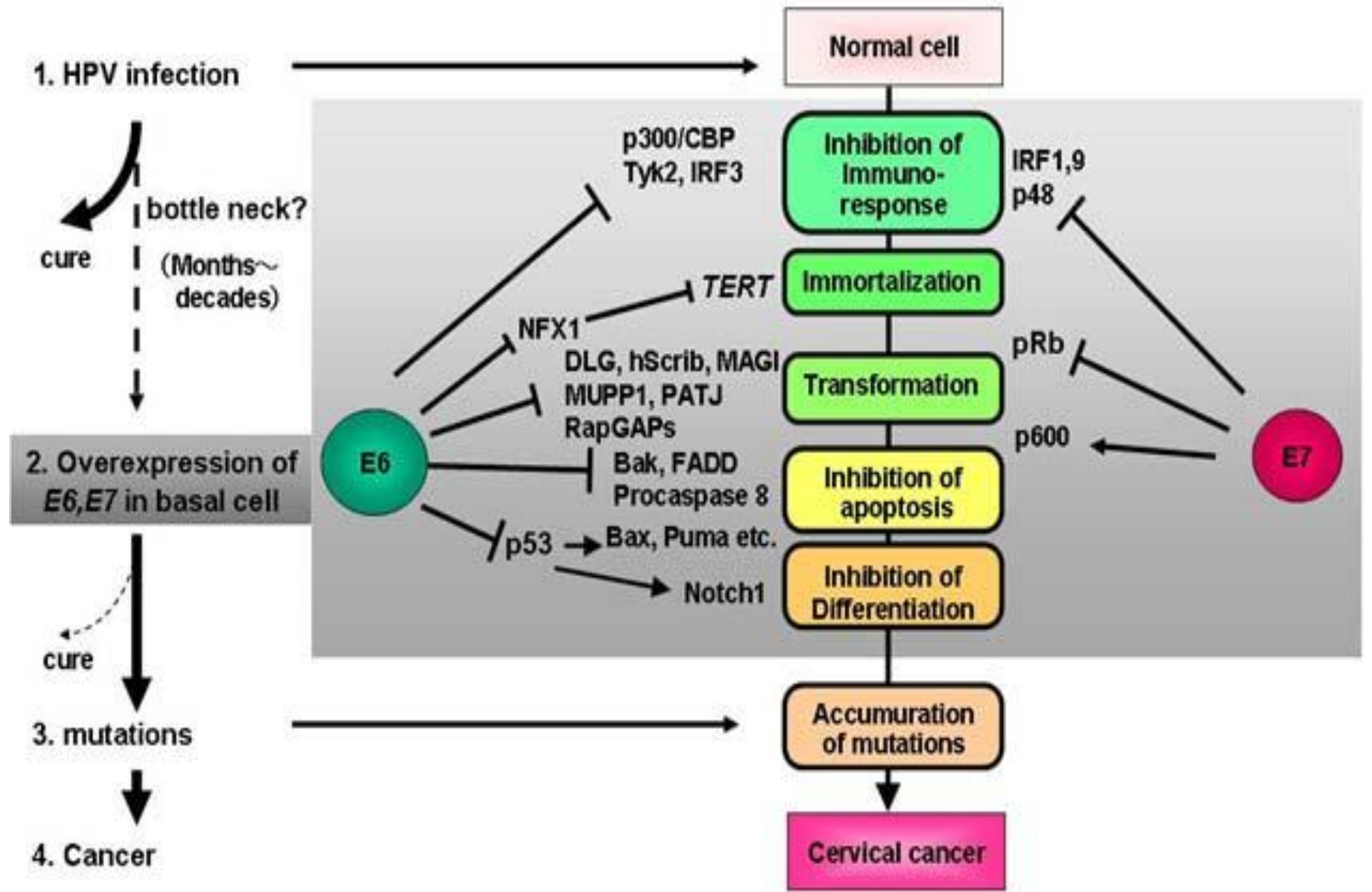
Oropharyngeal squamous cell carcinoma (SCC)

- H&N SCC smoking-associated declining
- Oropharyngeal Human papillomavirus (HPV)-related SCC: a distinct variant
- HPV-SCC main sites: tonsil and base of tongue
- Patients younger than the smoking-related SCC
- HPV-SCC mainly associated with HPV16 (85-90%)
- male predominance

- FNC patterns: basaloid, cheratinizing poorly differentiated, “cystic”

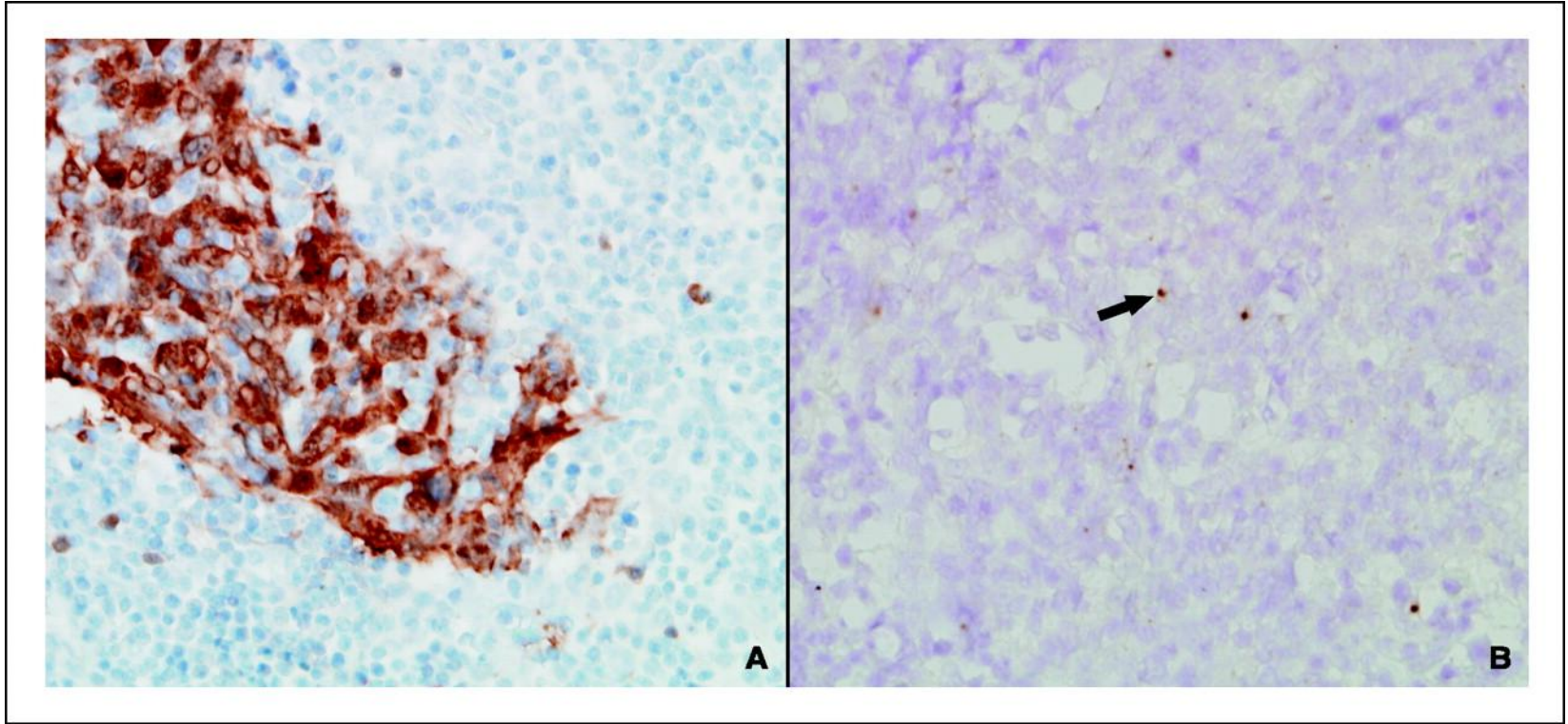


HPV-H&NSCC: E6,E7 overexpression. E6 determines the p53 loss, E7 the Rb inactivation, resulting in p16 over-expression



HPV16 analysis of a resected tonsil from a patient with a HPV16-positive metastasis and occult primary tumor.

Shahnaz Begum et al. Clin Cancer Res 2007;13:1186-1191



HPV analysis reveals atypical cells within the tonsillar crypts that are positive by p16 IHC (A) and HPV16 hybridization analysis (B)

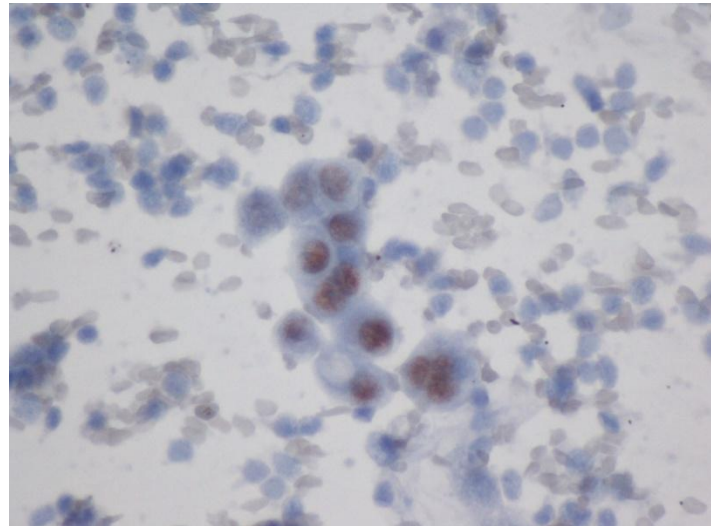
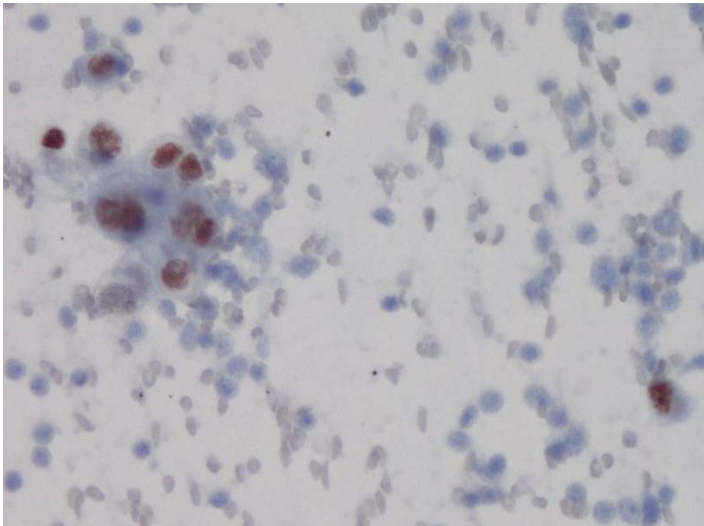
HPV detection in FNC samples

DNA or RNA detection by PCR or ISH

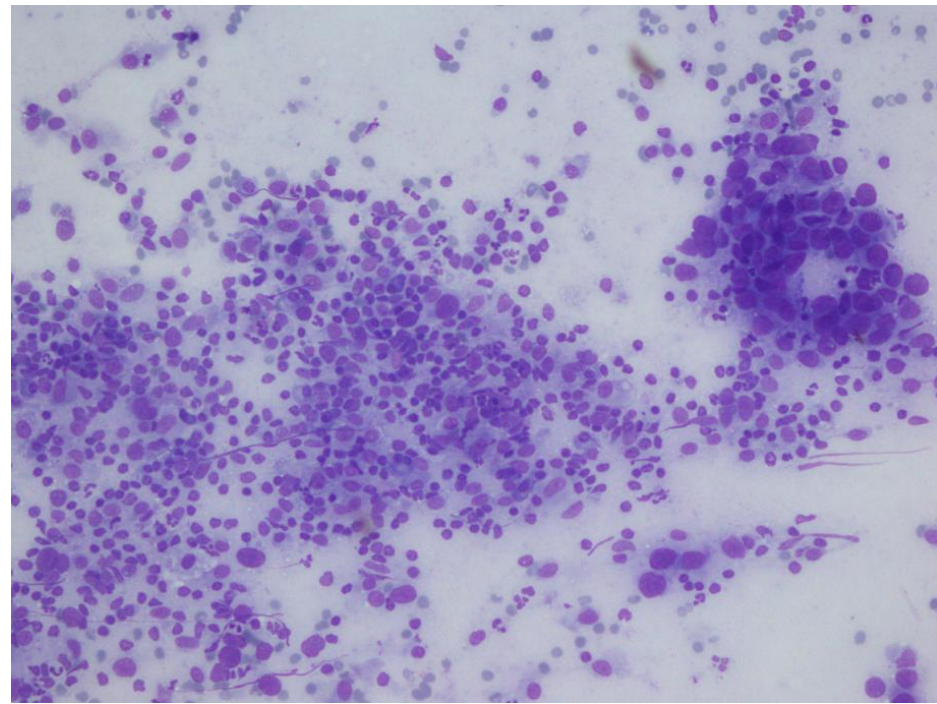
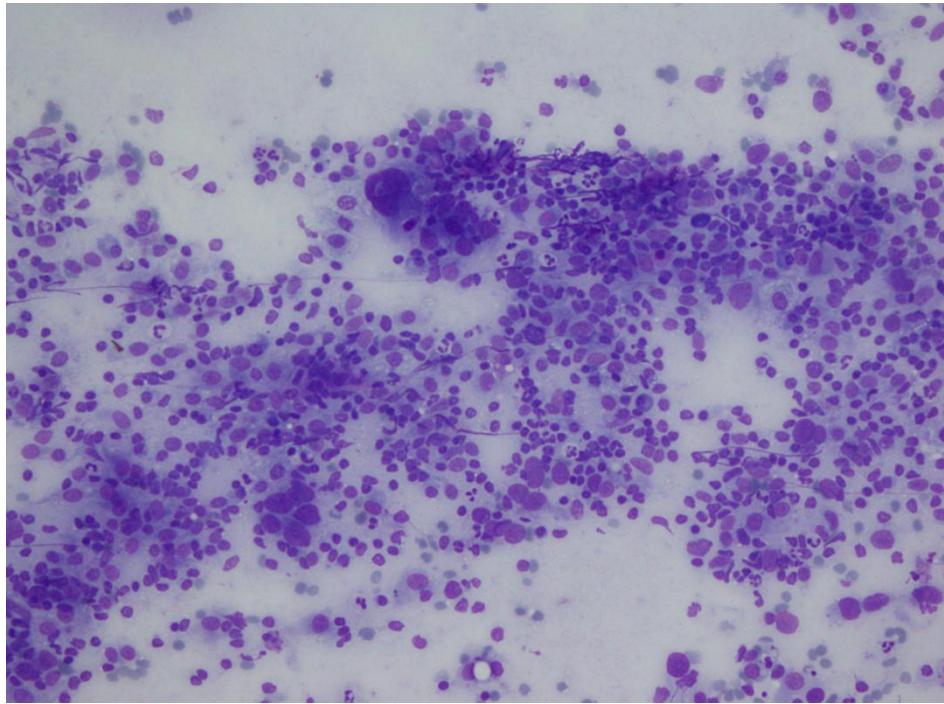
PCR high sensitive less specific

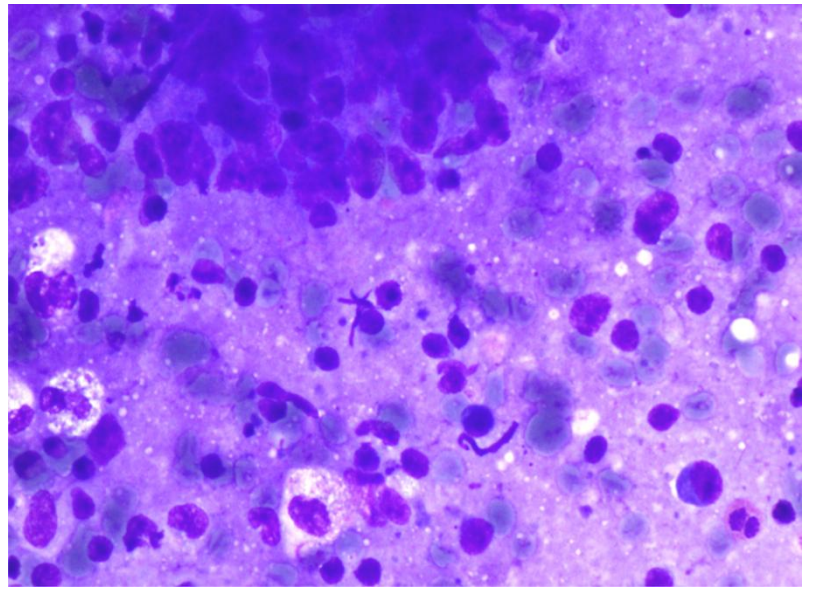
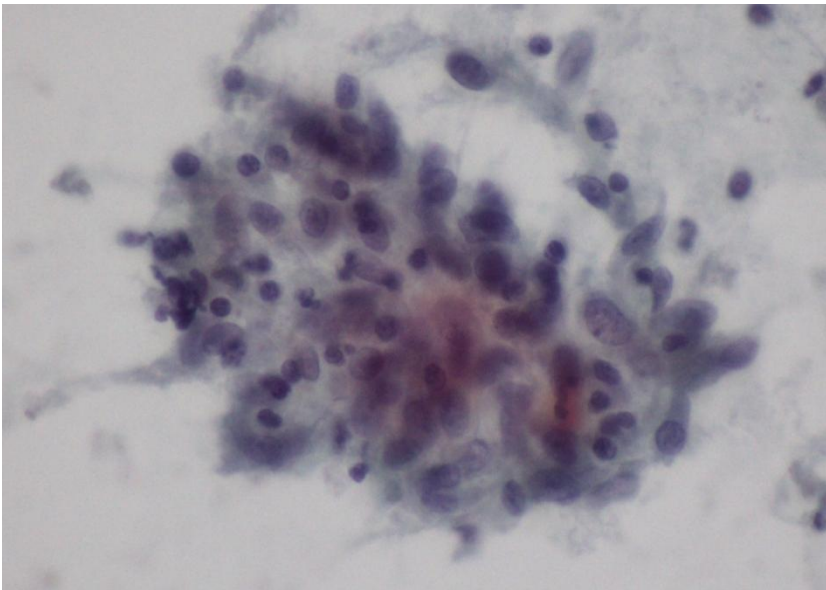
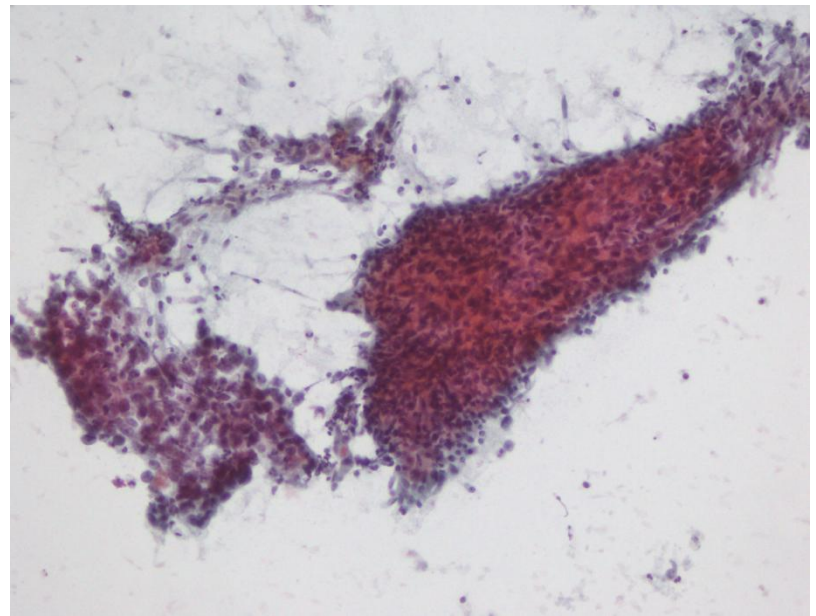
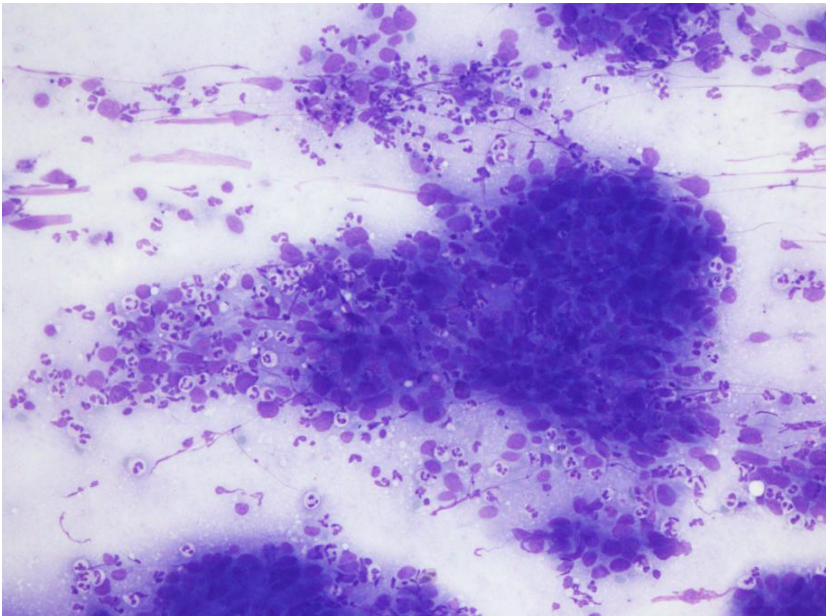
ISH high specific less sensitive

P16 Immunocytochemistry

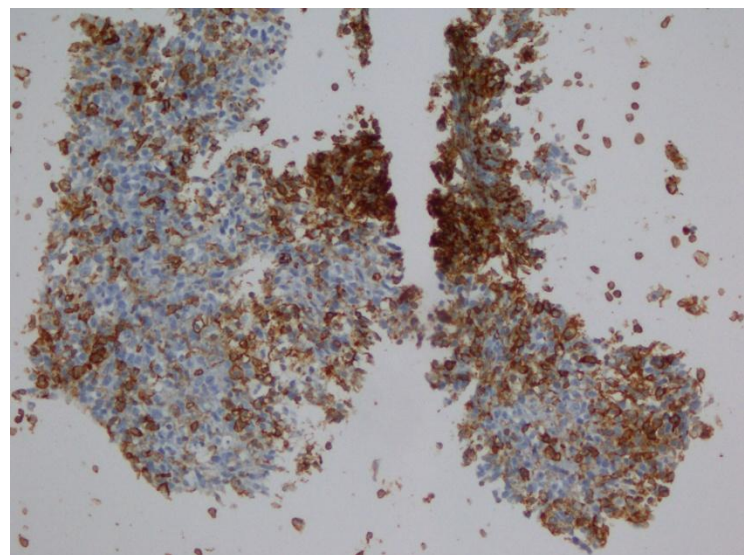
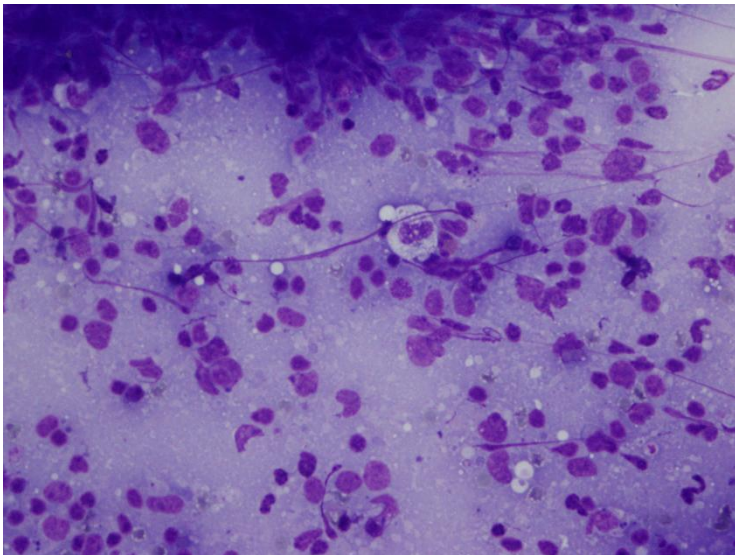
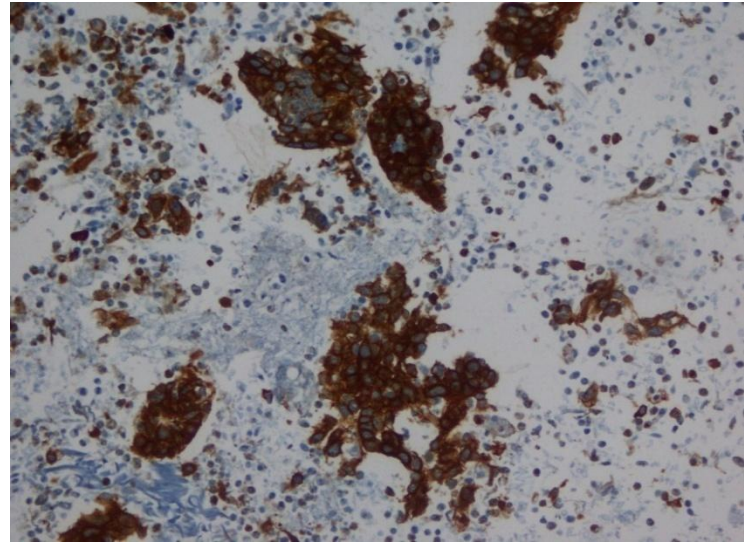
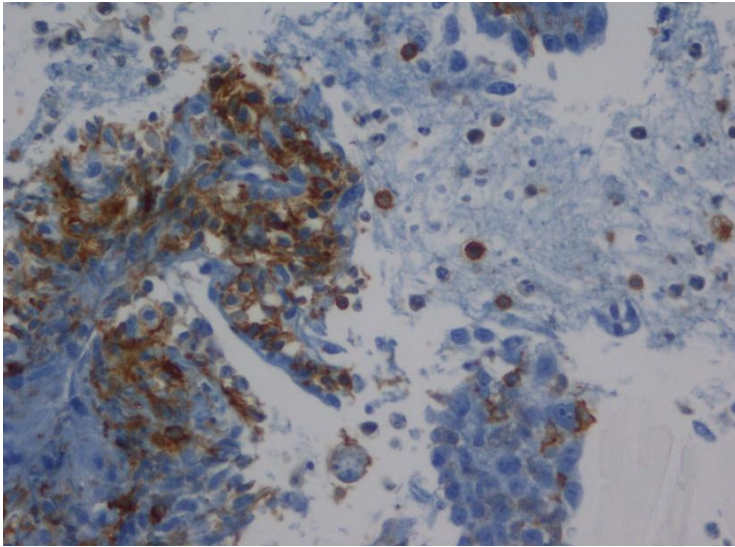


male 43yrs, 34mm, roundish, cervical lymph node





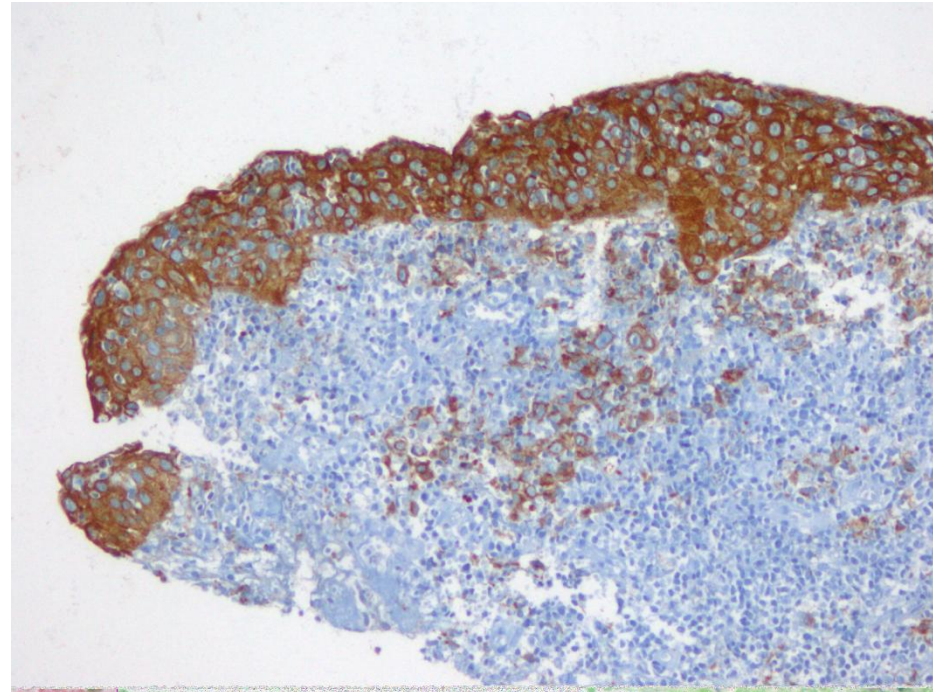
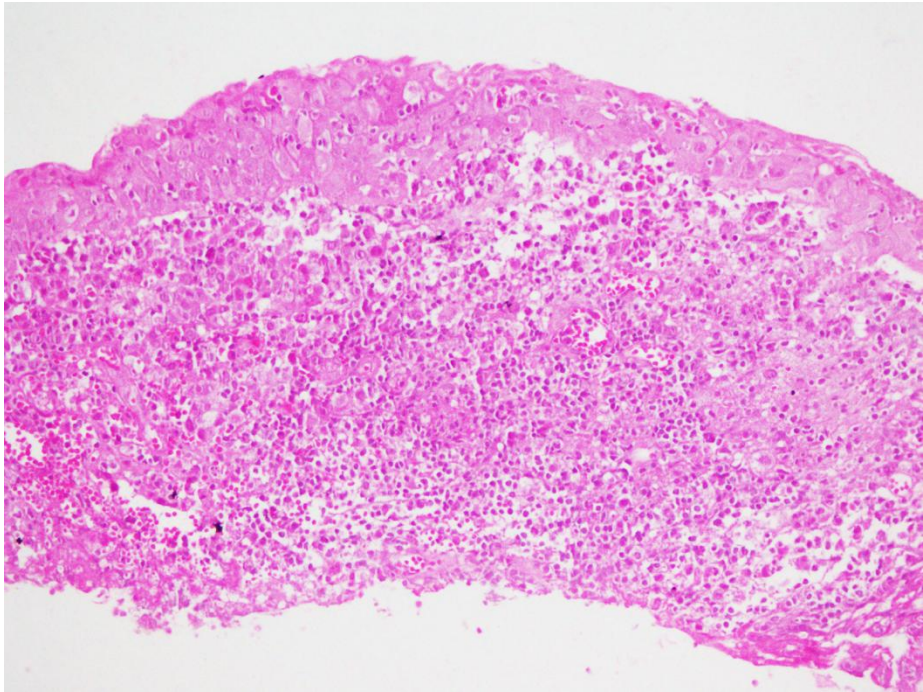
Lymph node metastasis from rhinopharynx undifferentiated carcinoma



nasopharyngeal undifferentiated carcinoma (NPC)

- the most common cancer of the nasopharynx
- may occurs in children and adults
- HBV-related
- Differences in epidemiology and behavior
- Type 1: squamous cell, Type 2a: keratinizing undifferentiated, Type 2b nonkeratinizing undifferentiated (lymphoepithelioma): the most common, EBV associated
- **Lymph node metastases are often first clinical sign!**

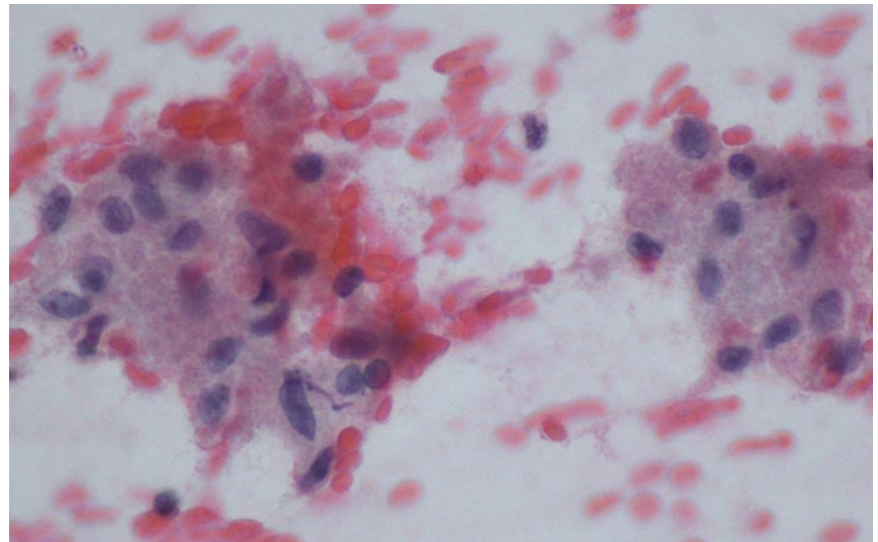
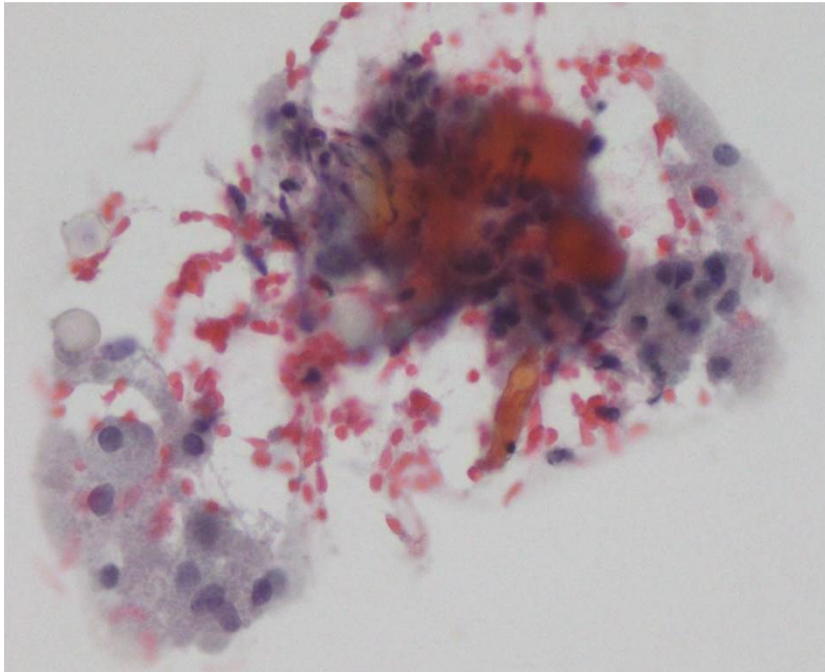
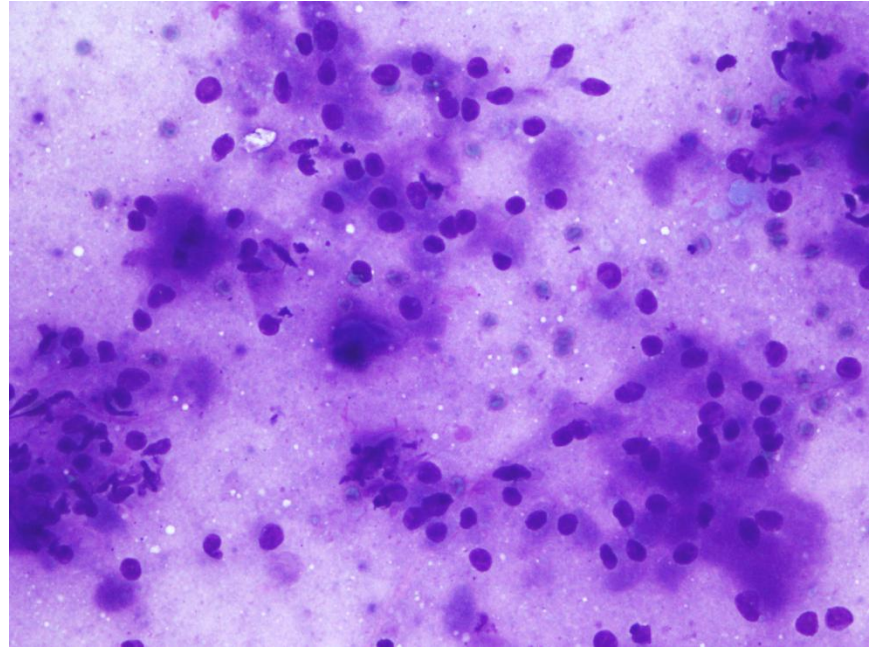
rhinopharynx undifferentiated carcinoma



Pusztaszeri MP, et al. Cytologic evaluation of cervical lymph node metastases from cancers of unknown primary origin. **Semin Diagn Pathol.** 2014; 14:109-9.

Toh ST et al. Residual cervical lymphadenopathy after definitive treatment of nasopharyngeal carcinoma: fine needle aspiration cytology, computed tomography and histopathological findings. **J Laryngol Otol.** 2011;125:70-7.

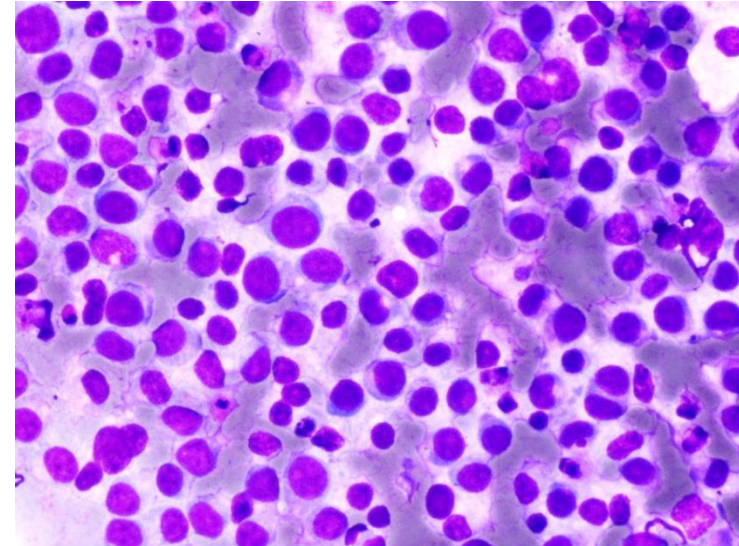
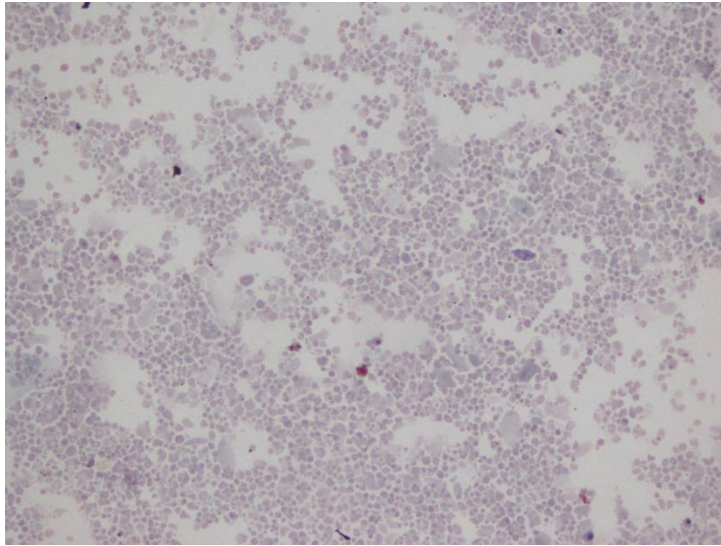
45 yrs male, sub-mucosal nodule of the tongue



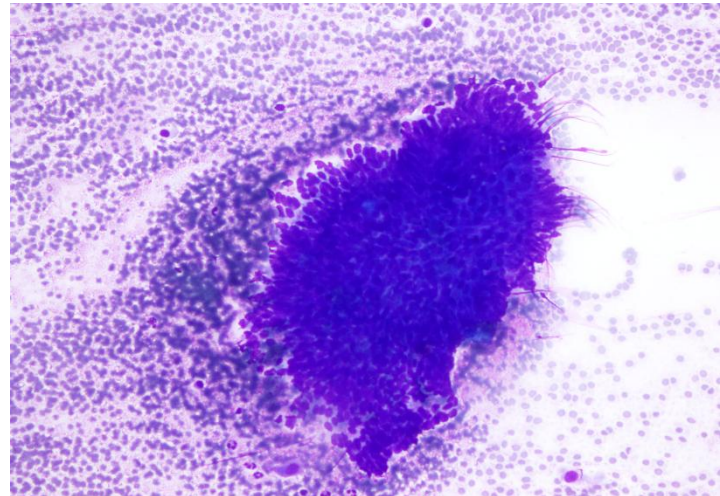
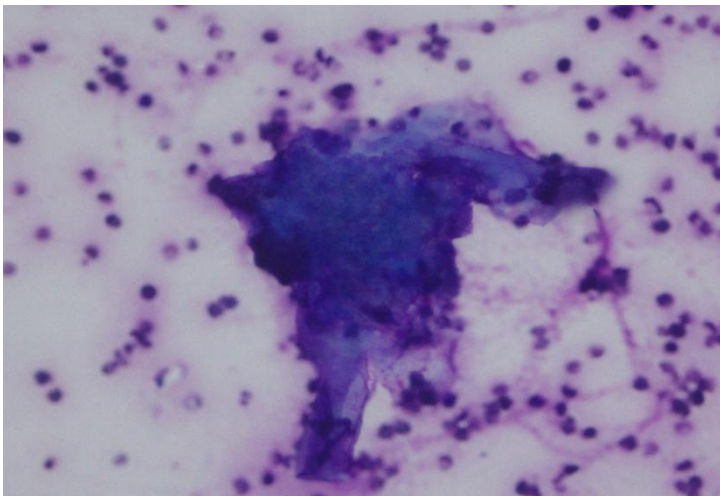
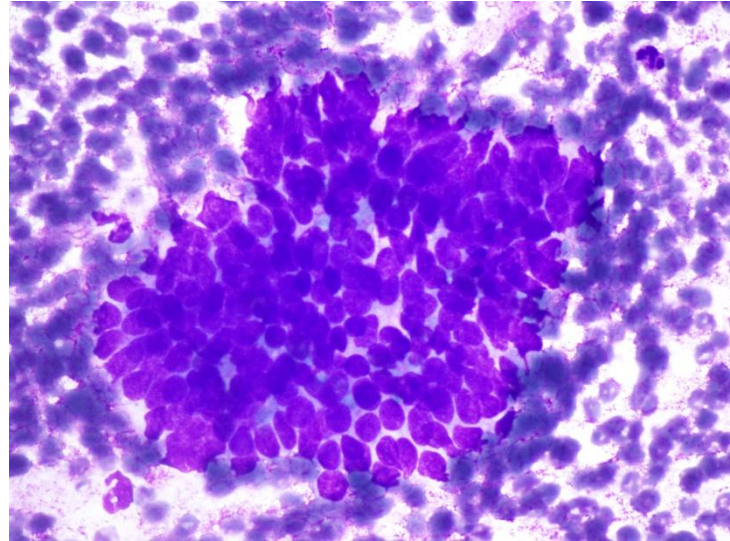
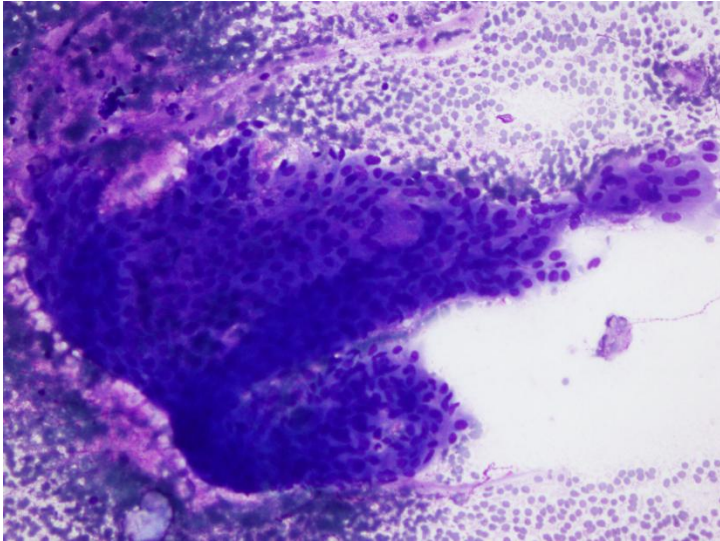
Abrikossoff's tumor, Granular cell myoblastoma, Granular cell schwannoma

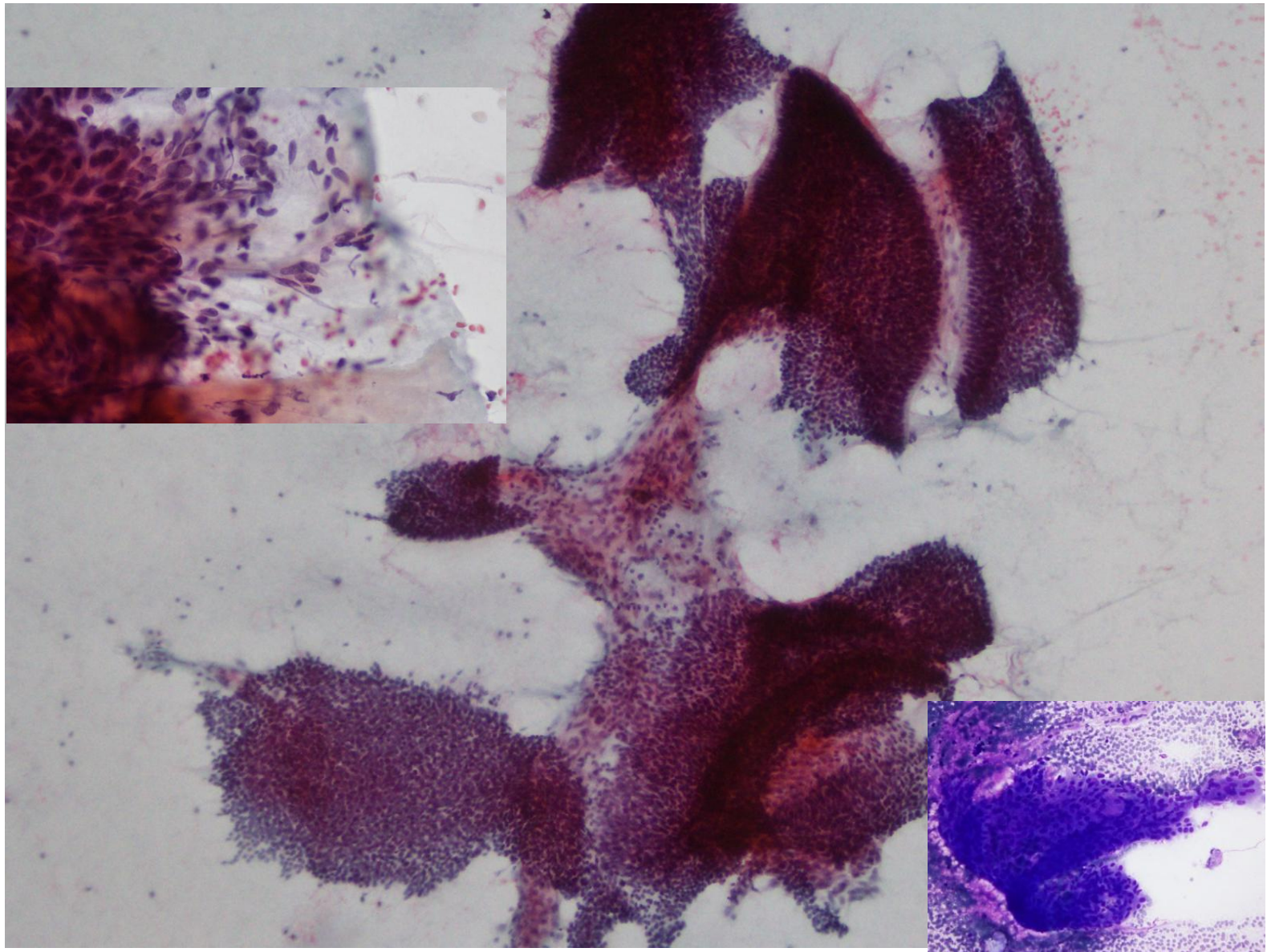
- Granular cell tumors may arise in all parts of the body
- **H&N:** 50% +/- , oral cavity and tongue 70% but larynx too.
- Malignant 2%
- Cytological diagnosis

jaw and maxilla osteolyses



30 yrs, male, expansive multicystic lesion of the jaw

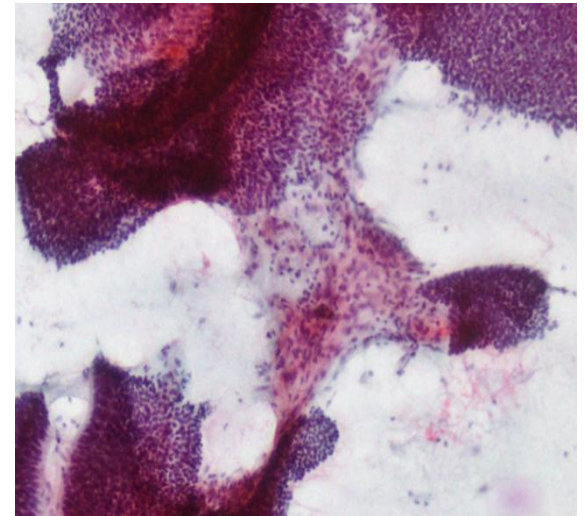
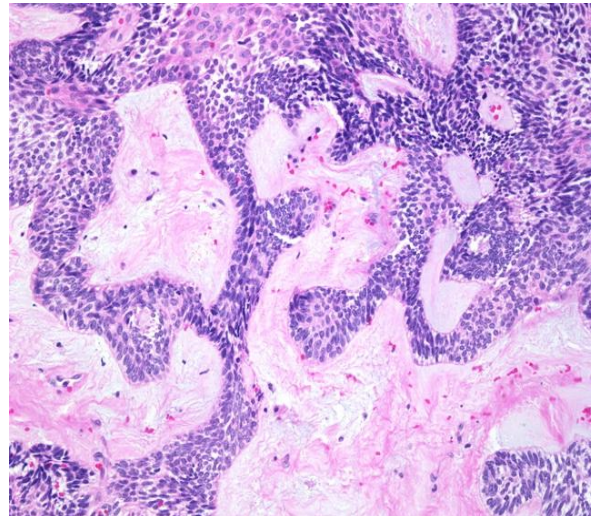
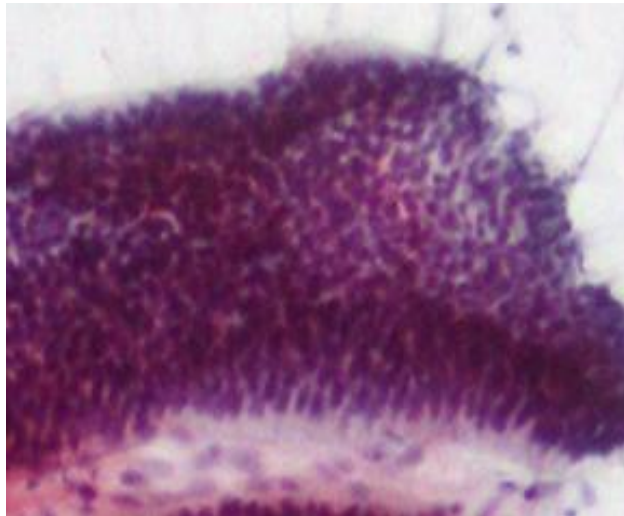




Ameloblastoma

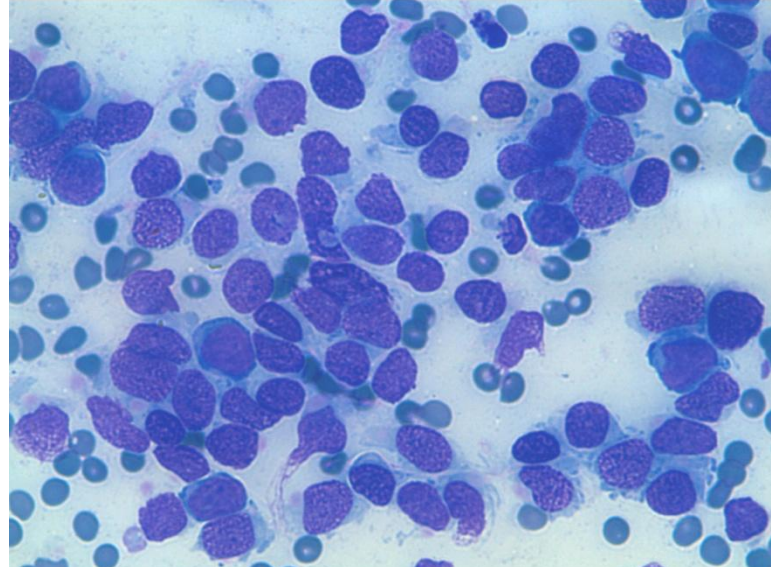
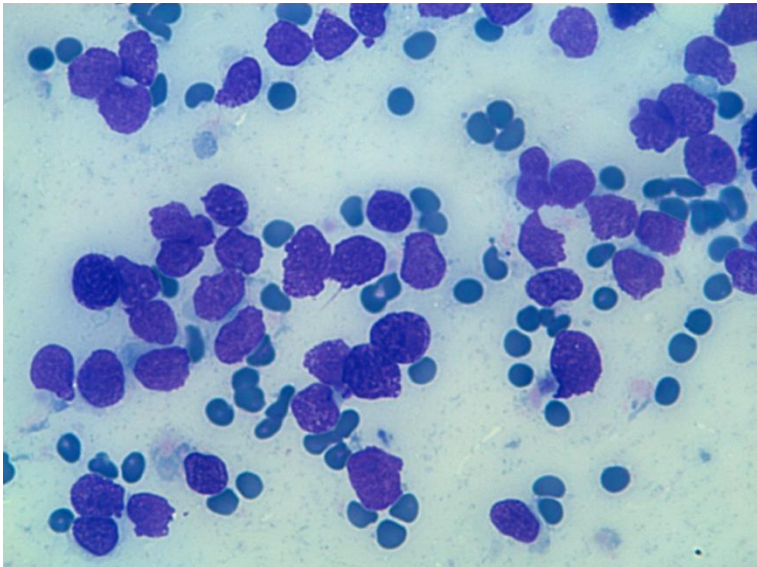
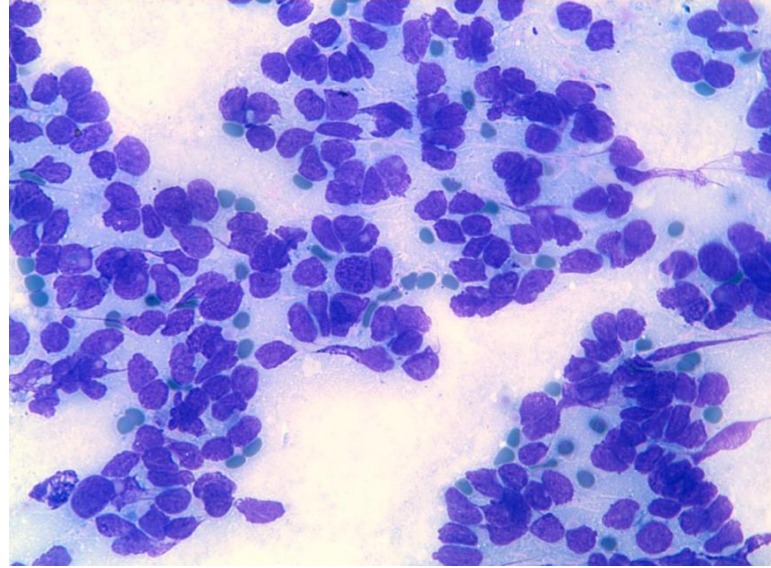
slowly growing odontogenic tumor of jaw or maxilla, infiltrates and destroys the bone, can cause face abnormalities. Almost always benign, surgical treatment.

Pathology: unicystic, multicystic. Nuclear reverse polarization and picket fence arrangement, inner stellate reticulum cells. **Variants:** desmoplastic, granular, basal, plexiform, follicular, acanthomatous

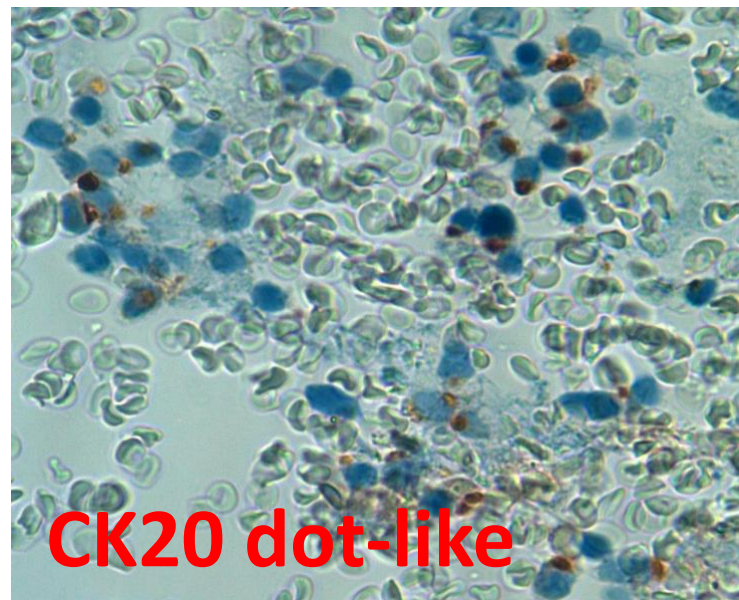
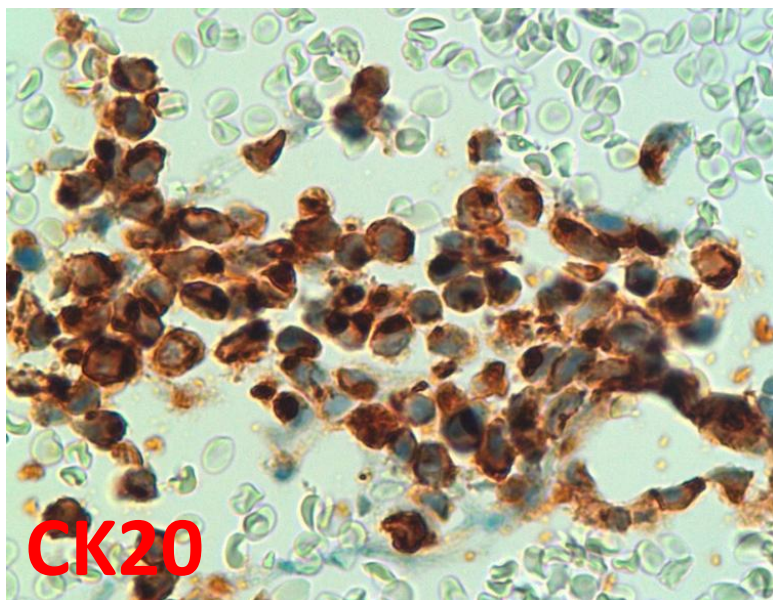
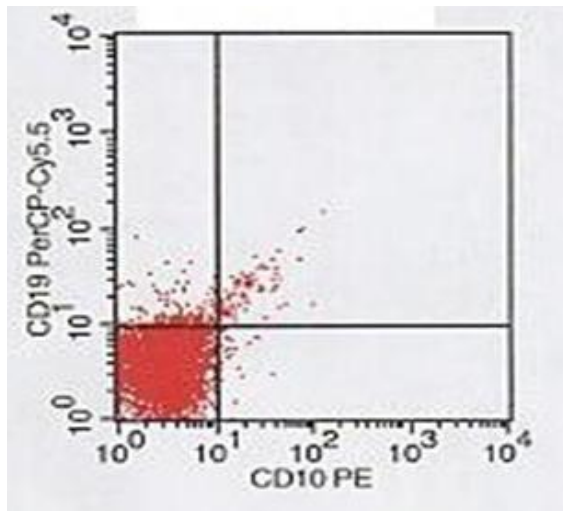


- Klapsinou E et al. Fine-needle aspiration cytology of ameloblastoma and malignant ameloblastoma: a study of 12 cases. *Diagn Cytopathol.* 2013; 41:206-11.

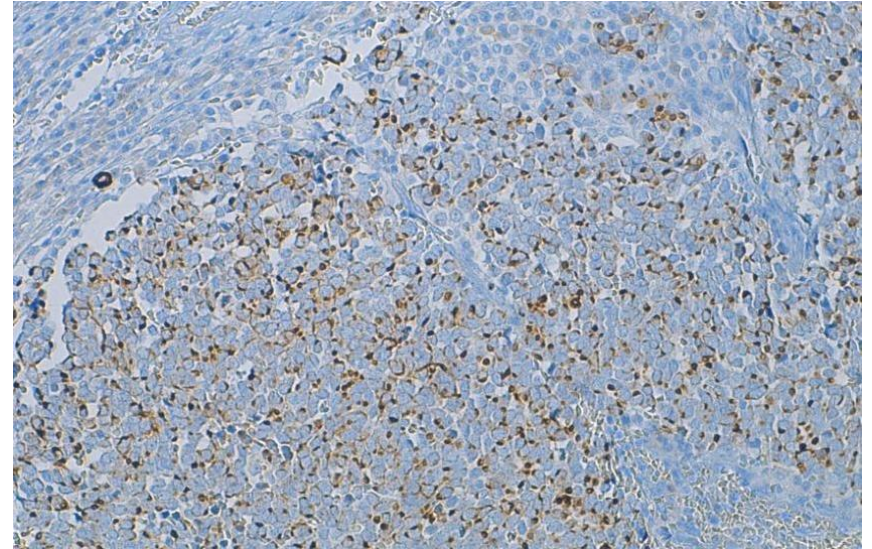
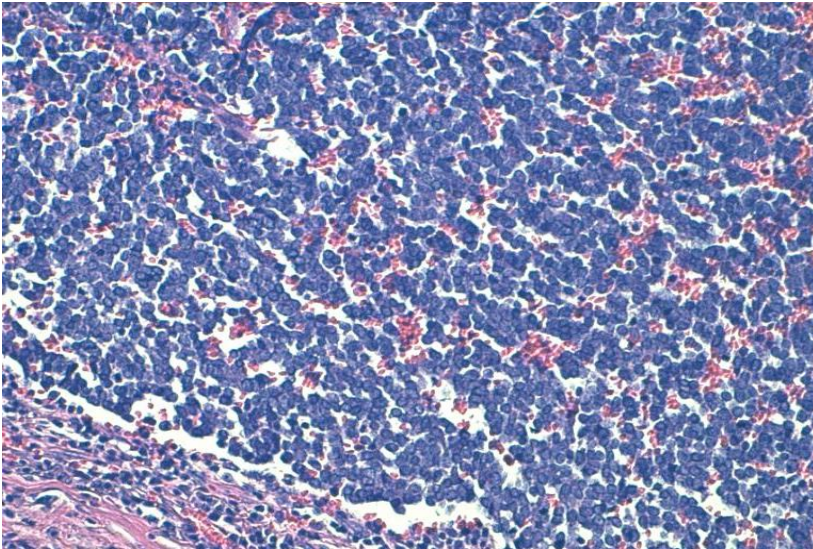
46 yrs old female, autistic, reddish cutaneous nodule of the cheek



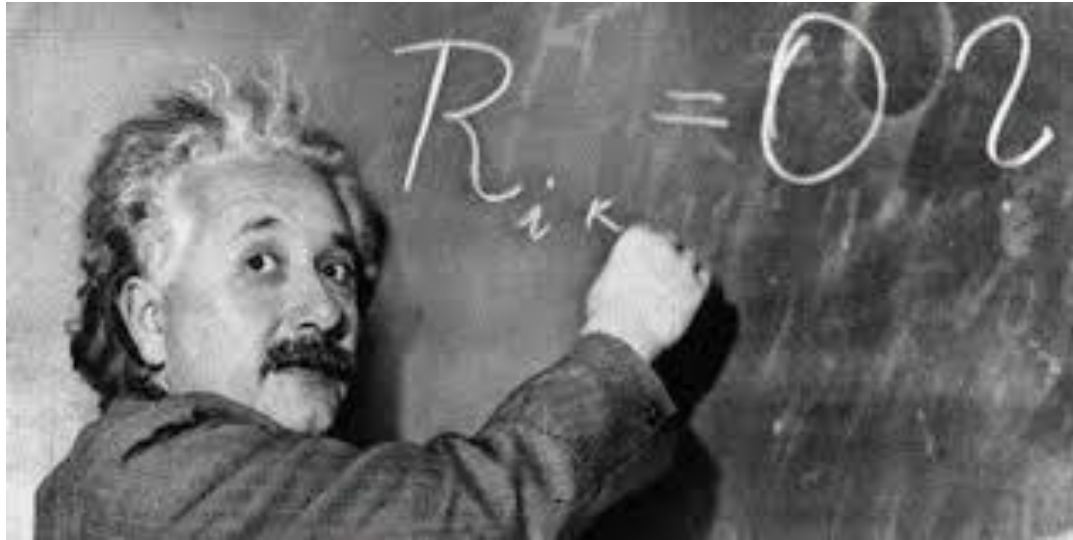
FC and immunocytochemical findings



Merkel cell carcinoma (MCC)



- rare, highly aggressive skin tumor, elderly population
- >50% on the head and neck
- frequent local recurrence and metastases
- High mortality



From Wikipedia: **Diff-Quik** is a Romanowsky stain variant.....pioneered by **Bernard Witlin** in 1970.

From PUB MED:

1: Witlin B. The use of acid-isopropyl alcohol in the acid-fast staining procedure. Mycopathol Mycol Appl. 1974;52:187-90. PubMed PMID: 4135177.

2: GERSHENFELD L, WITLIN B. Iodine as an antiseptic. Ann N Y Acad Sci. 1950;53:172-82. PubMed PMID: 15433173.

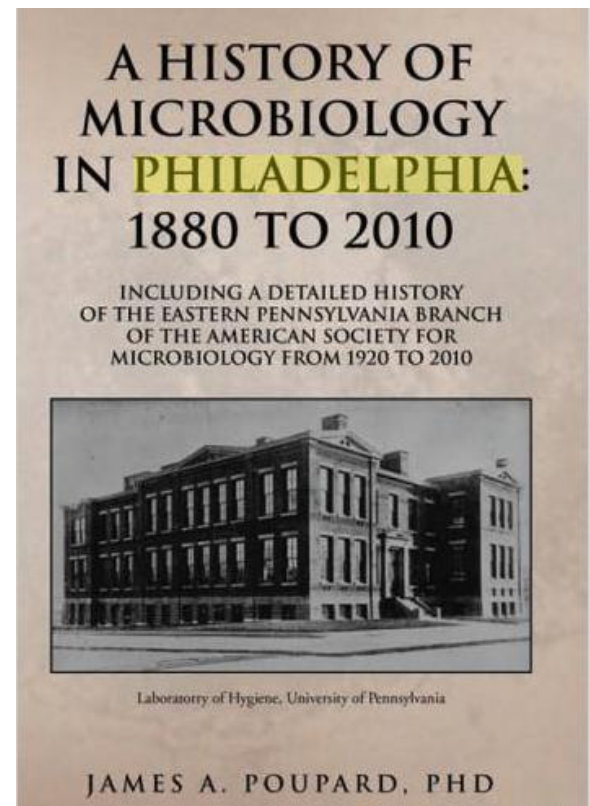
ANNALS of THE NEW YORK
ACADEMY OF SCIENCES

IODINE AS AN ANTISEPTIC

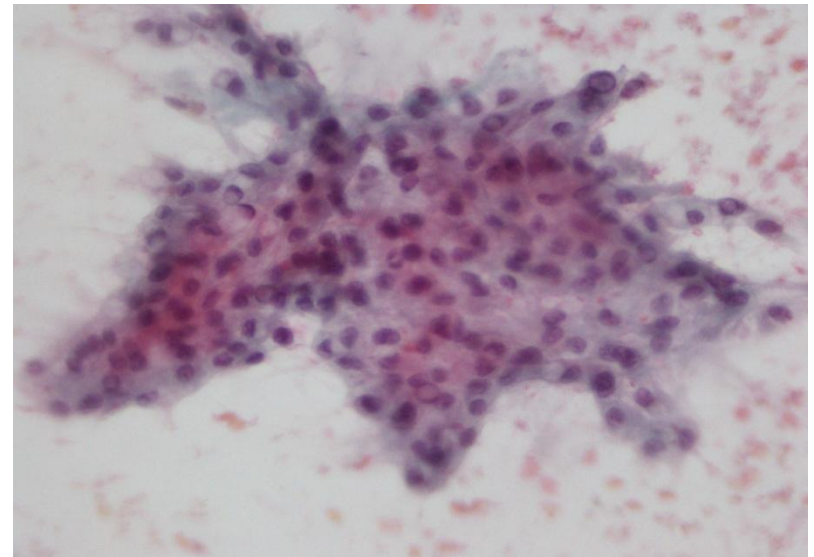
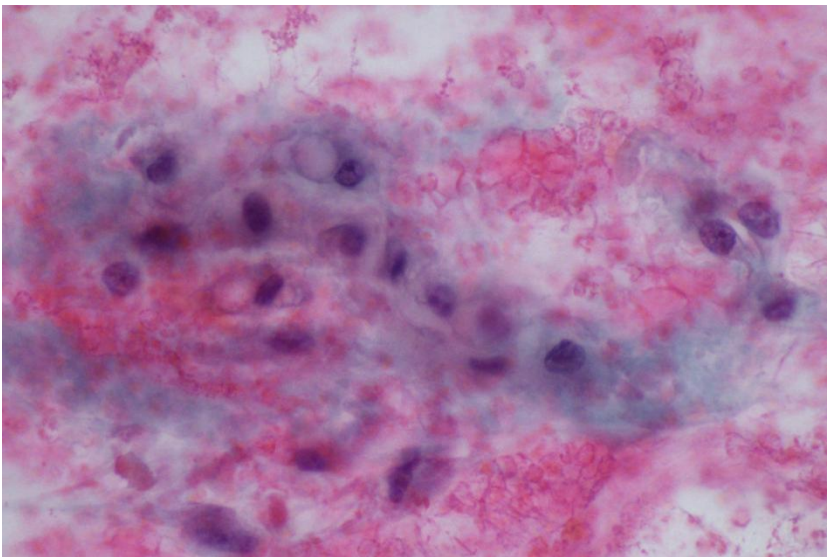
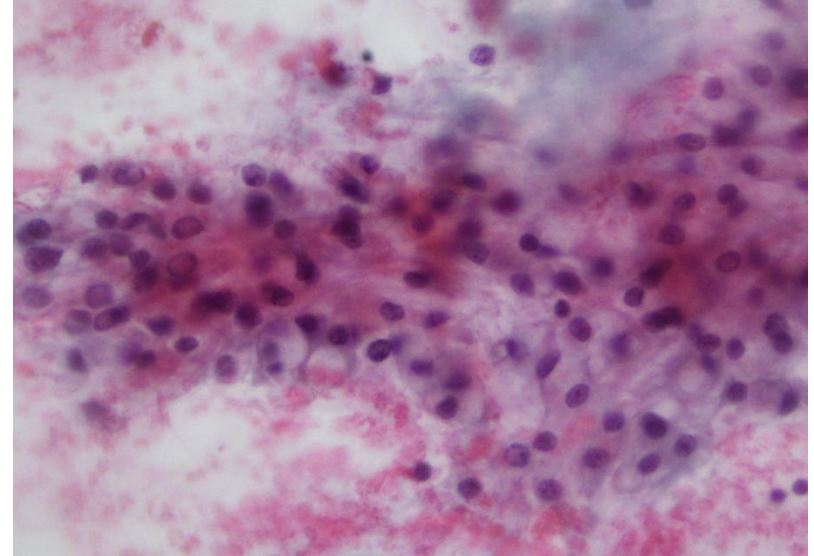
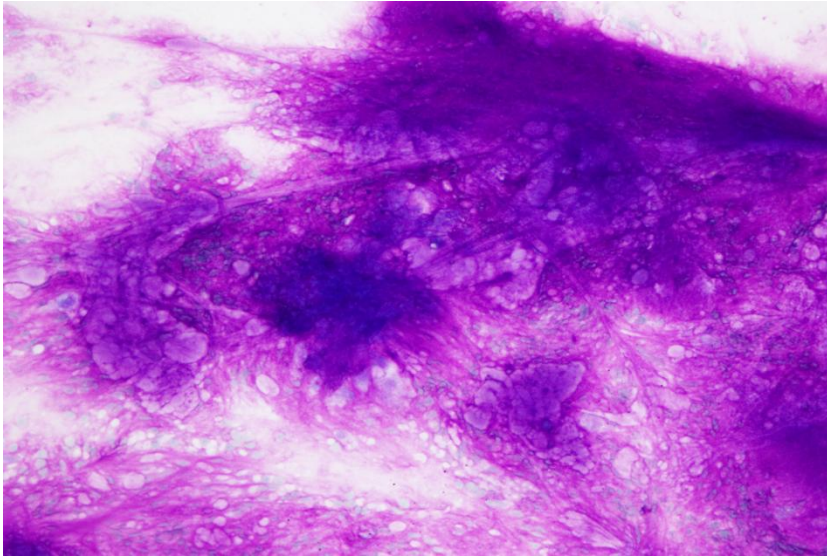
By Louis Gershenfeld and Bernard Witlin

Department of Bacteriology, Philadelphia College of Pharmacy and Science, Philadelphia, Pa.

Since the latter part of the nineteenth century, much has been written extolling the alleged virtues of iodine as an antiseptic. This has been largely due to the fact that it fulfills a function that many bactericides do



male, 54 yrs, 4 cm nodule base of the neck



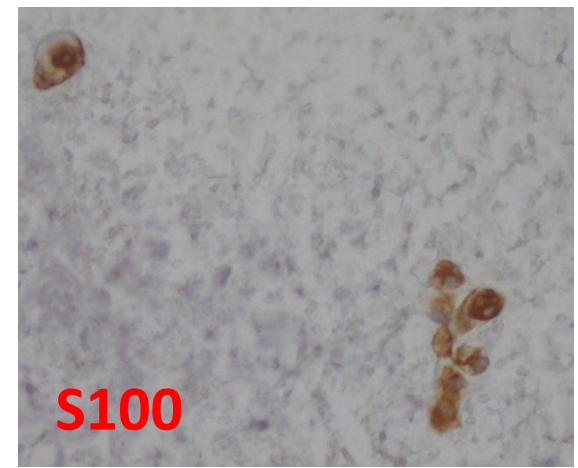
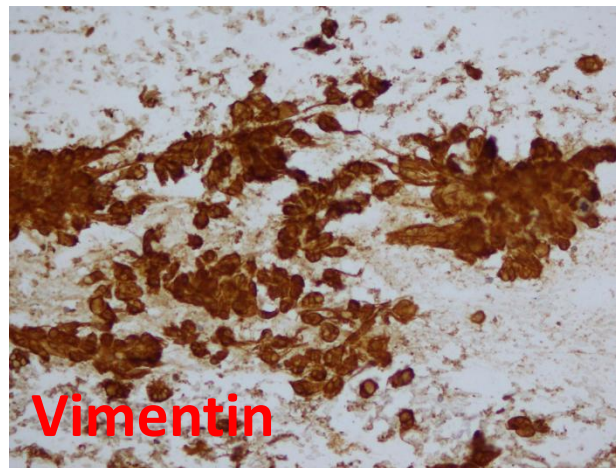
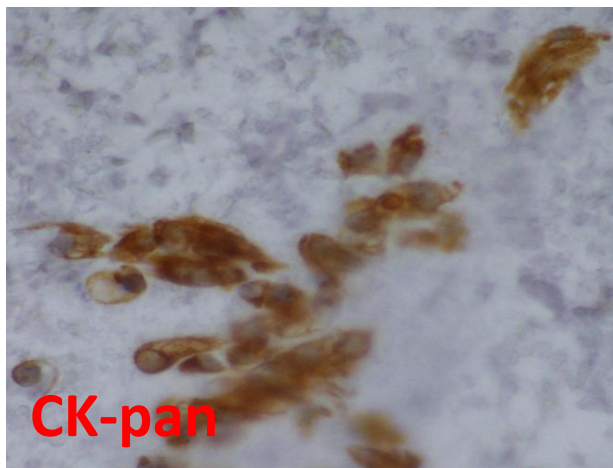
Chordoma

rare, slow-growing, notochord remnants tumor, arise from the skull base and anywhere along the spine.

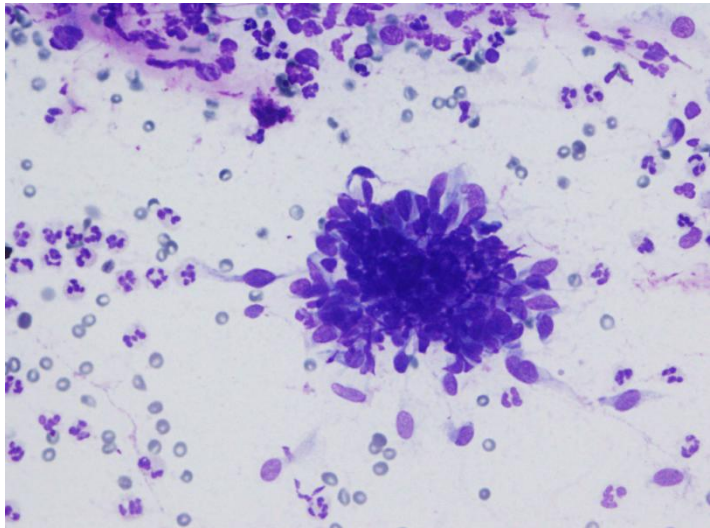
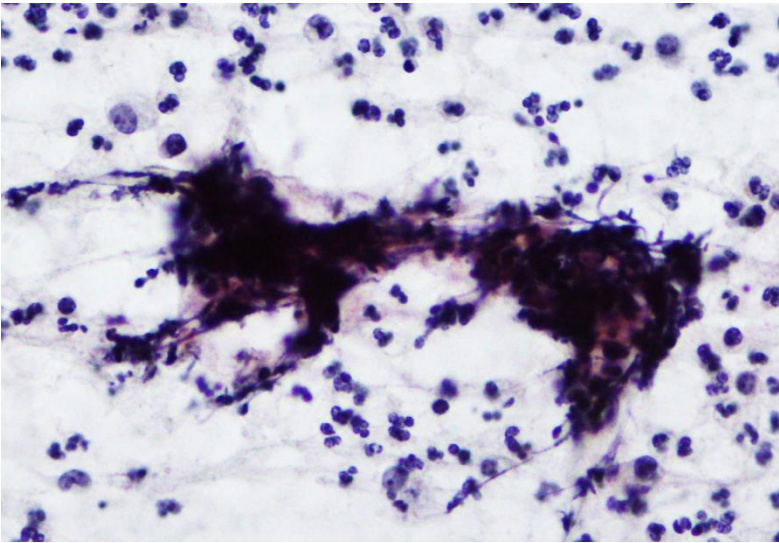
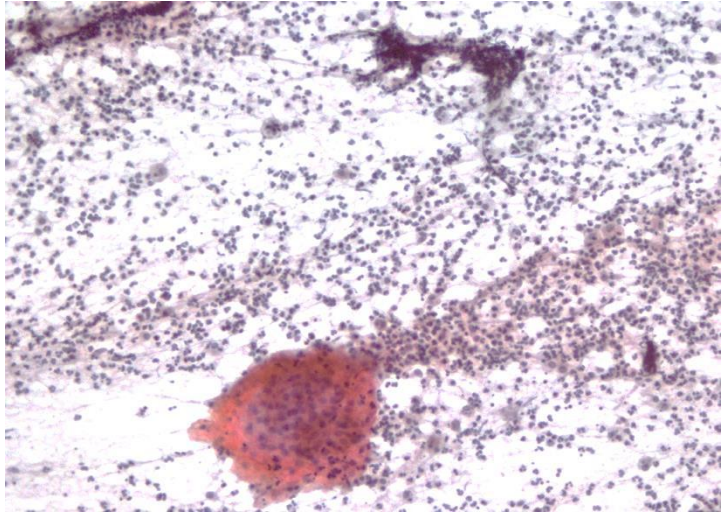
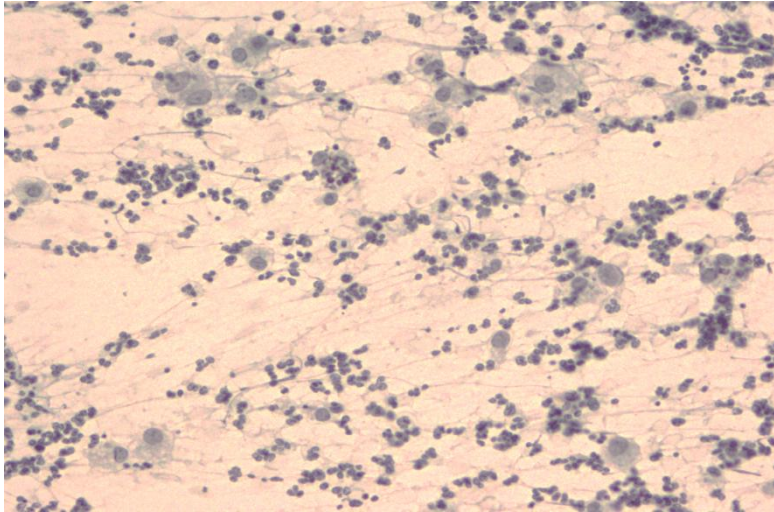
Variants: classical, chondroid and dedifferentiated.

Histology: lobulated, cells with small round nuclei and abundant vacuolated cytoplasm “physaliferous” separated by fibrous septa.

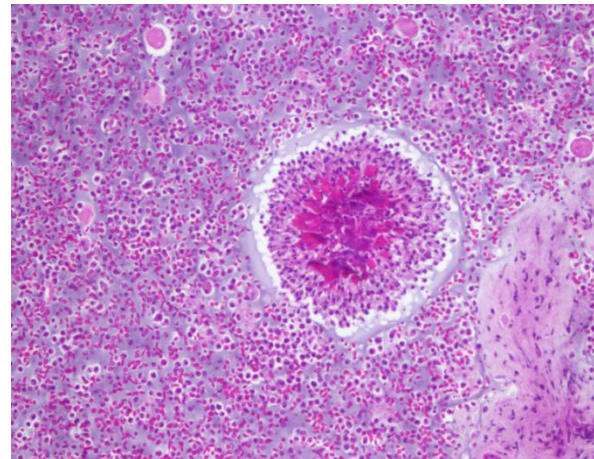
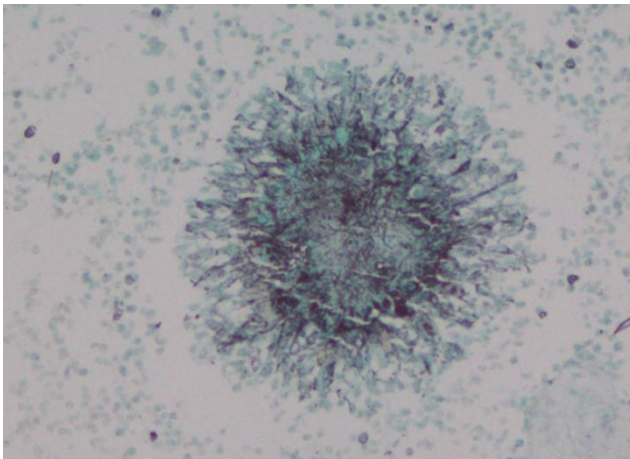
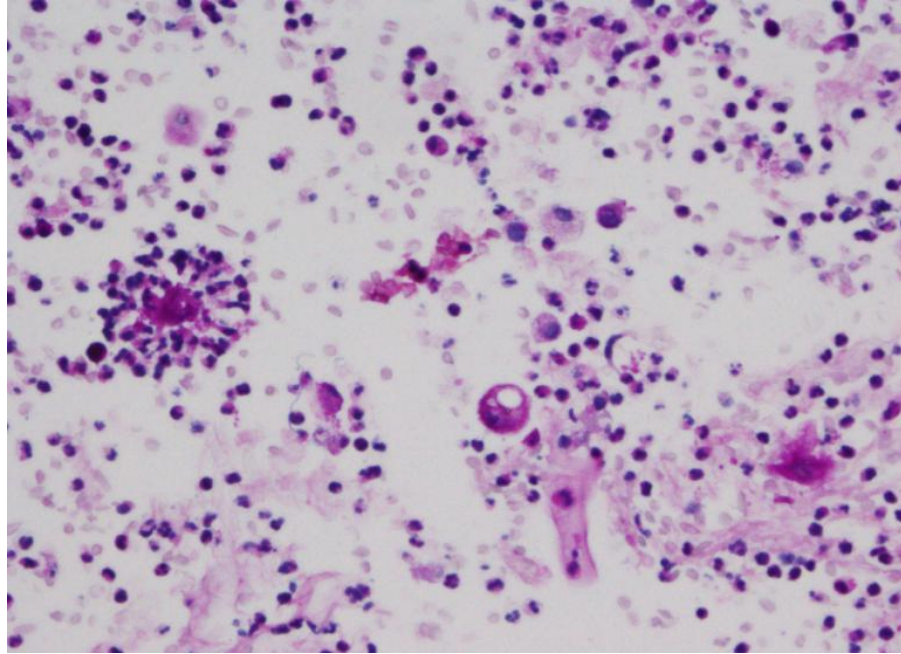
Chondroid chordomas: features of both chordoma-chondrosarcoma



female, 36yrs, submandibular swelling



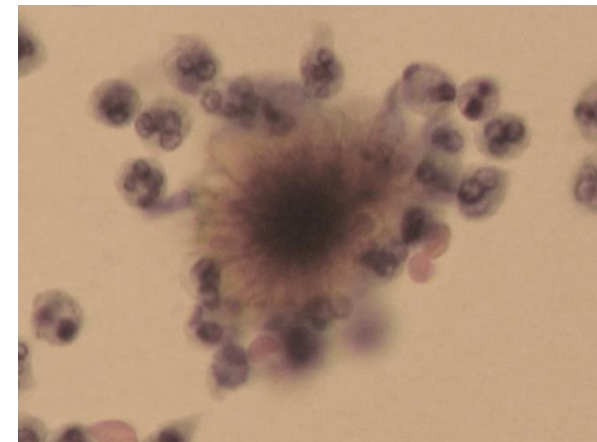
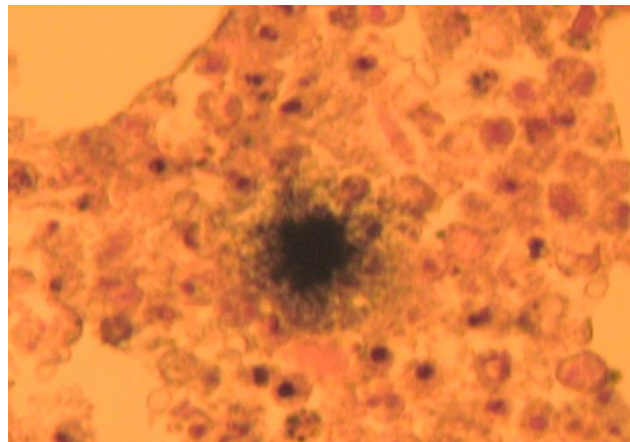
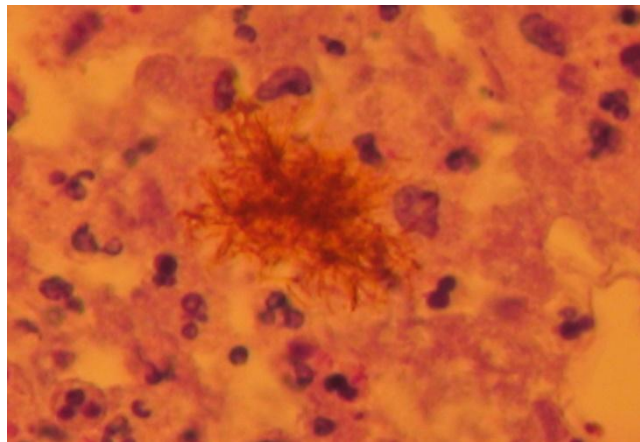
actinomycrosis



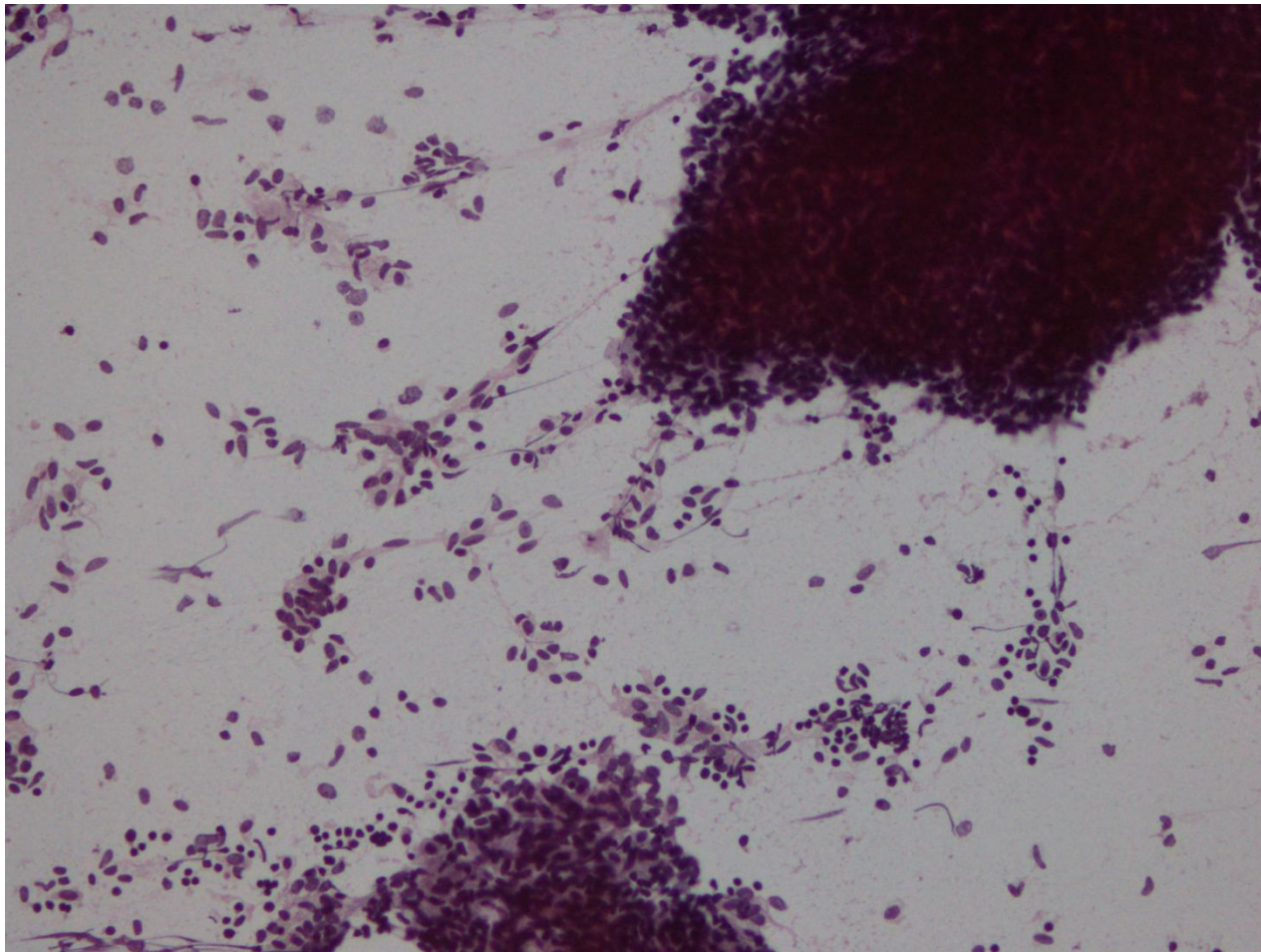
actinomyces

Actinomyces of the head and neck may disguise itself as a tumor or present as a draining abscess which has failed to reveal an infectious agent as its etiology.

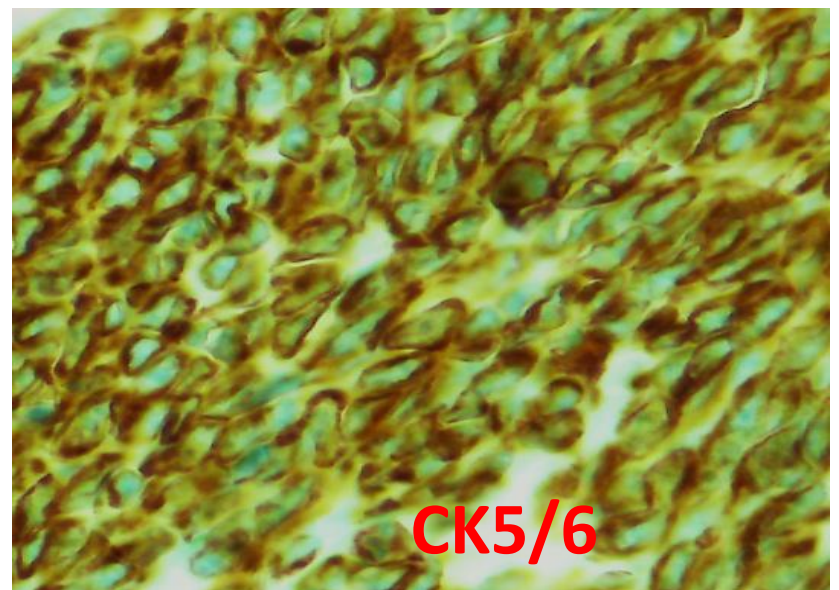
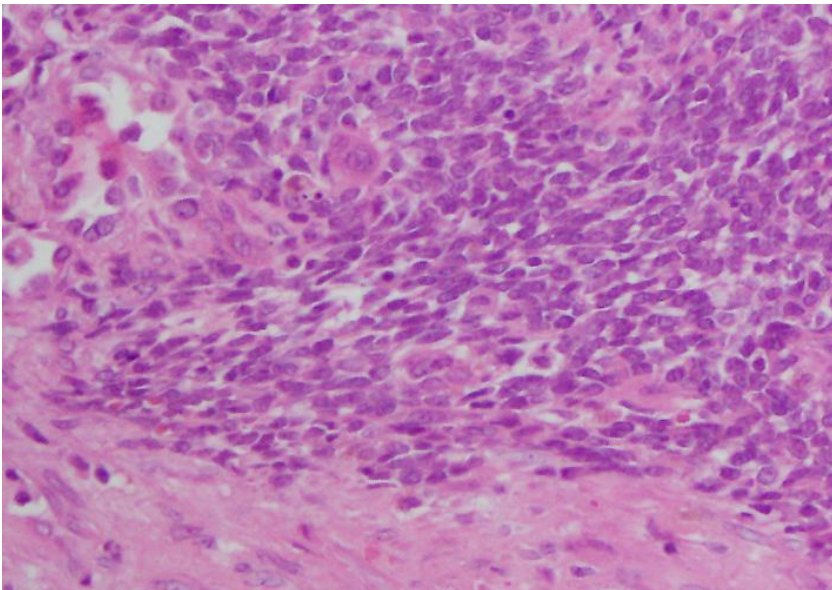
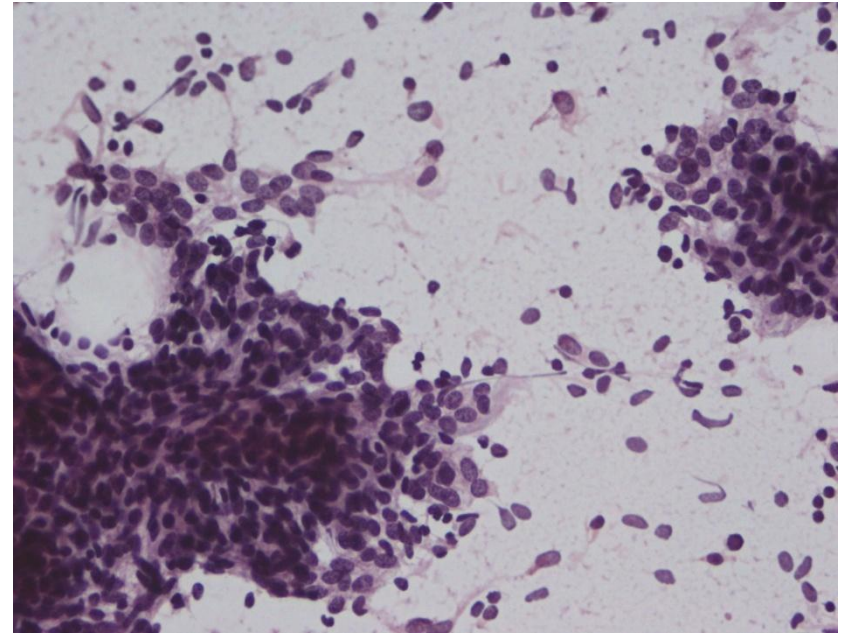
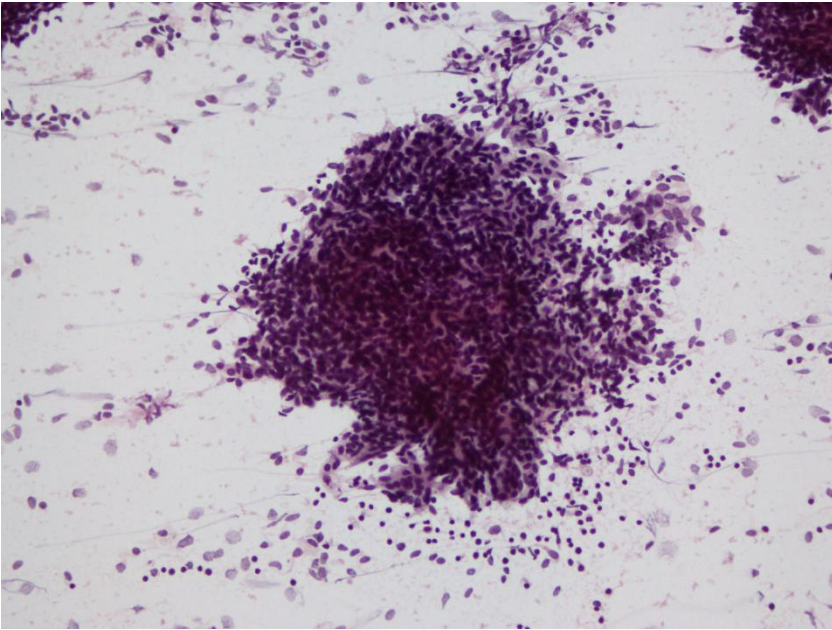
- Pézier TF, et al. Fatally invasive actinomyces masquerading as a tonsillar carcinoma. *Head Neck* 2014;36:129-30.
- Sittitjai P et al. Actinomyces presenting as a parotid tumor. *Auris Nasus Larynx* 2012;39:241-3.
- Custal-Teixidor M et al. Fine-needle aspiration cytology in the diagnosis of cervicofacial actinomyces: report of 15 cases. *Med Oral Patol Oral Cir Bucal*. 2004;9:467-70.



54 yrs, male, right cervical, 3 cm, solid nodule (previous surgery.....)



Spindle cell thymoma



“ectopic” thymoma

develops from remnants endodermal diverticula from the third branchial pouch (pharyngeal pouch)



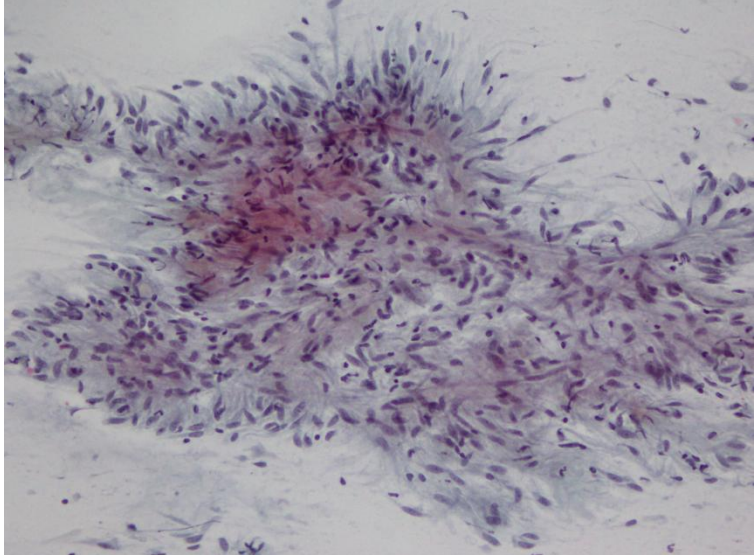
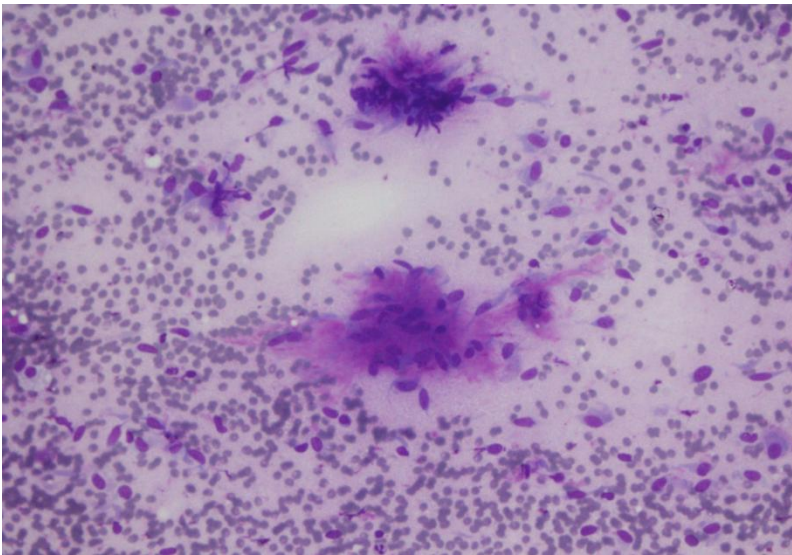
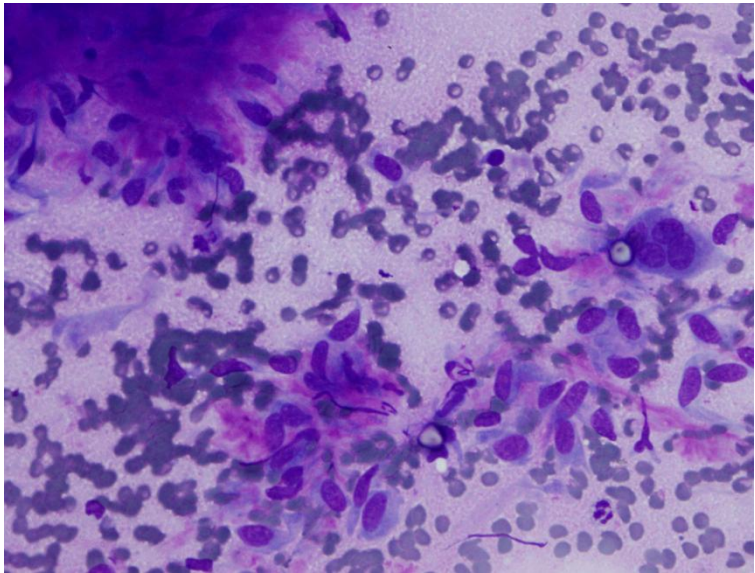
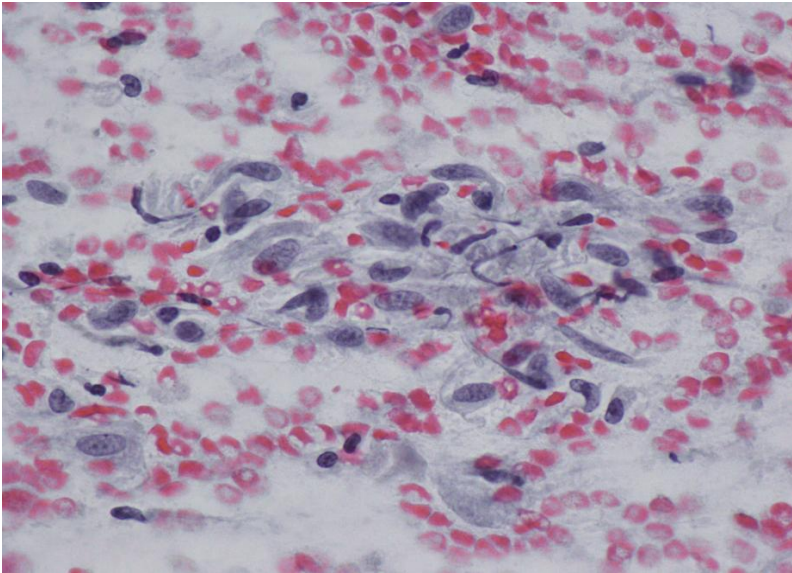
Tawevisit M et al. Ectopic thymoma can mimic benign and malignant thyroid lesions on fine needle aspiration cytology: a case report and literature review. *Acta Cytol.* 2013;57:213-20.

Zeppa P et al. Fine needle cytology and flow cytometry of ectopic cervical thymoma: a case report. *Acta Cytol.* 2010;54:998-1002.

Yan B et al. Ectopic cervical thymoma: a report of two cases of a rare entity frequently misdiagnosed on fine needle aspiration cytology and frozen section. *Head Neck Pathol.* 2010;4:152-6.

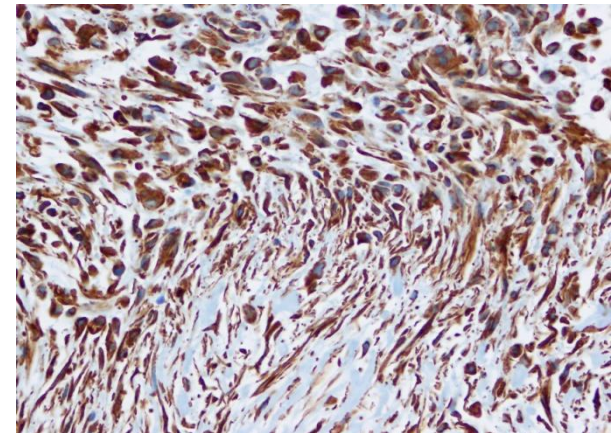
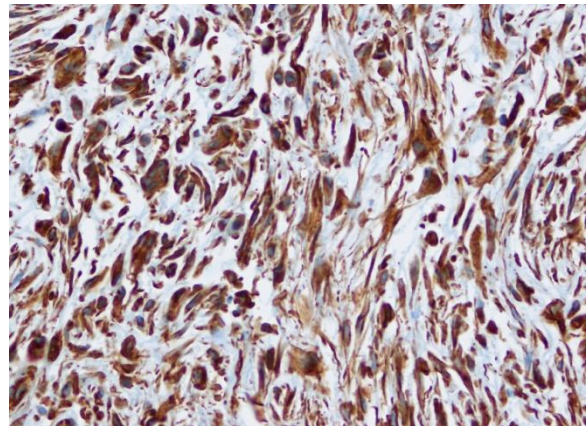
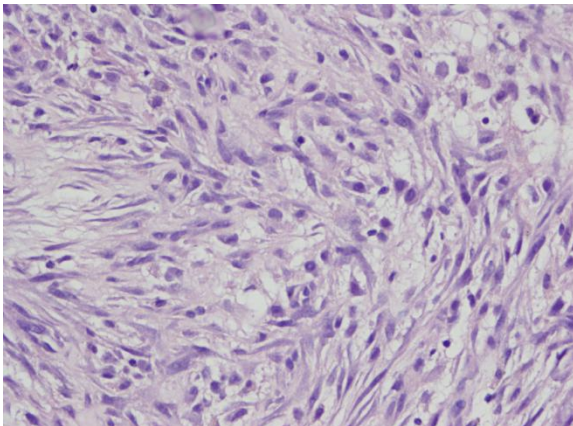
Ponder TB et al. Diagnosis of cervical thymoma by fine needle aspiration biopsy with flow cytometry. A case report. *Acta Cytol.* 2002;46:1129-32.

Cervical, sub cutaneous nodule, rapid growing



nodular fasciitis (NF)

- NF: pseudo-sarcomatous lesion involving the subcutaneous tissue and fascia
- NF is part of a heterogeneous group of reactive soft tissues proliferative lesions with proliferative fasciitis and myositis.
- NF arises more frequently in the arms but may occur in H&N too
- It grows rapidly and may clinically simulate a malignant mesenchymal tumor
- recurrences extremely rare



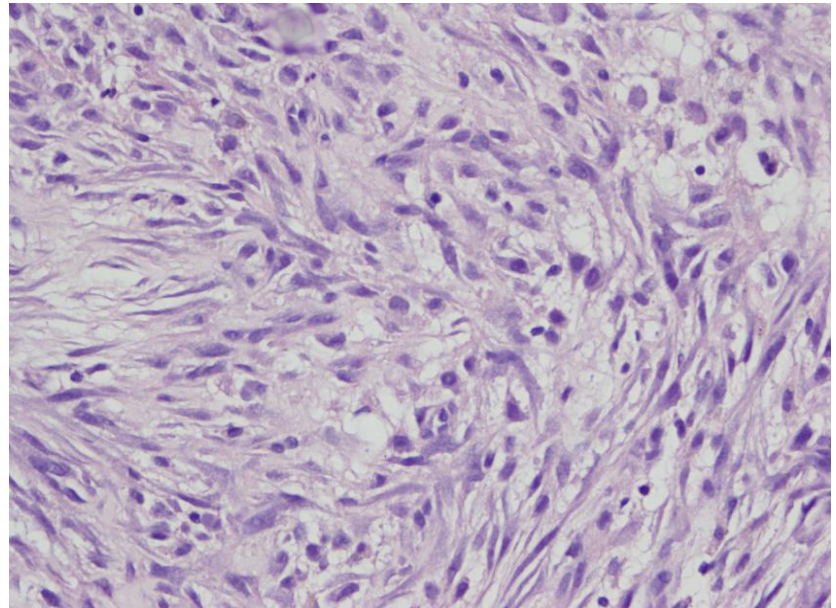
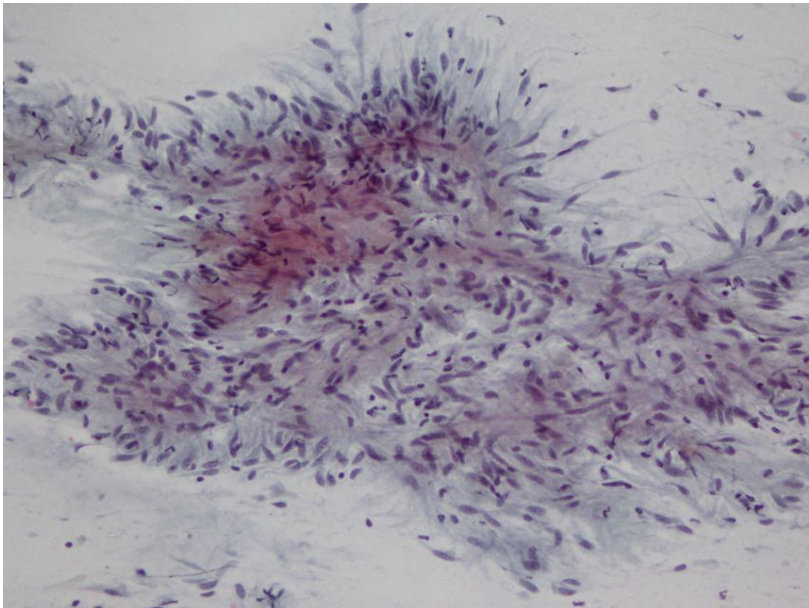
H&N nodular fasciitis

Weinreb I et al. Nodular fasciitis of the head and neck region: a clinicopathologic description in a series of 30 cases. *J Cutan Pathol*. 2009;36:1168-73.

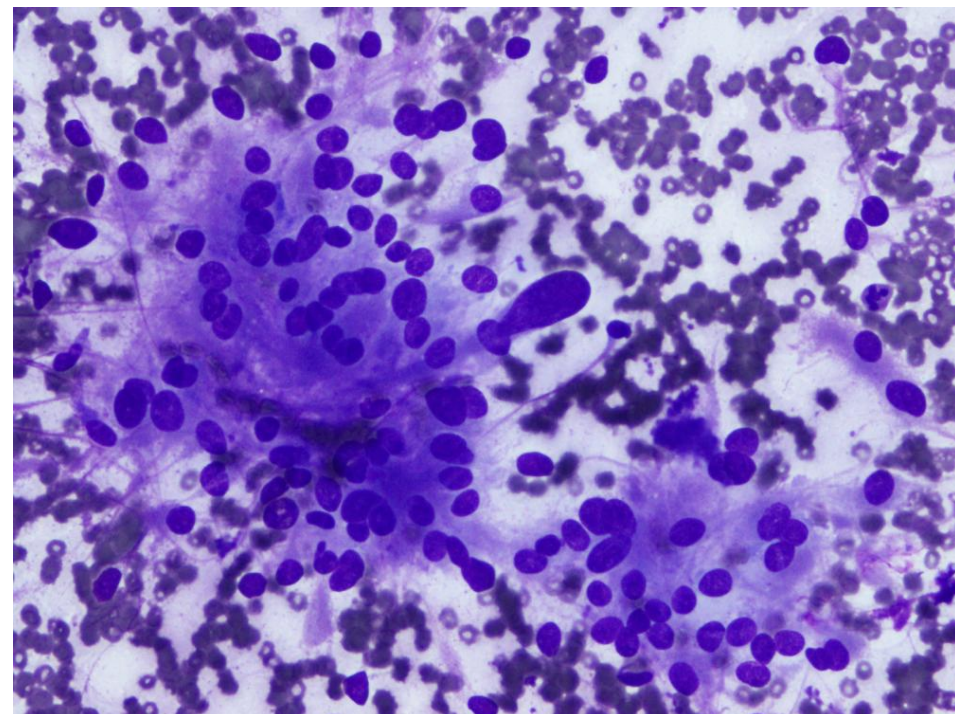
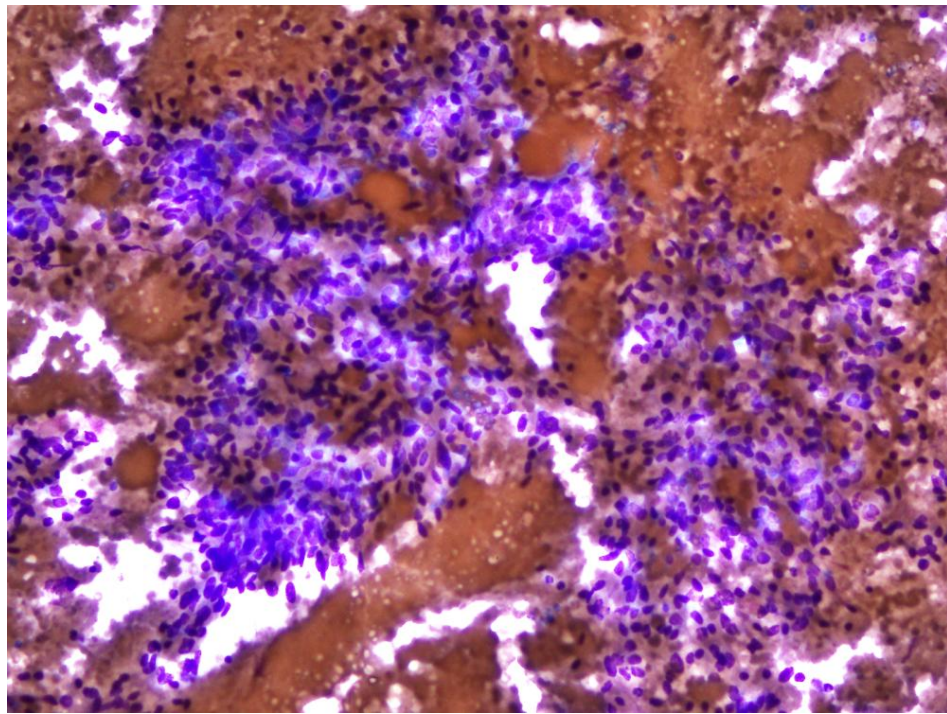
Gibson TC et al. Parotid Gland Nodular Fasciitis: A Clinicopathologic Series of 12 Cases with a Review of 18 Cases from the Literature. *Head Neck Pathol*. 2014 [Epub ahead of print]

Wong NL et al. Pseudosarcomatous fasciitis and myositis: diagnosis by fine-needle aspiration cytology. *Am J Clin Pathol*. 2009 ;132:857-65.

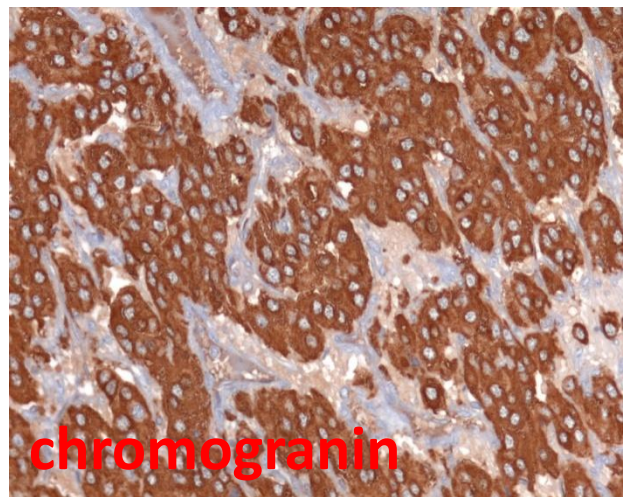
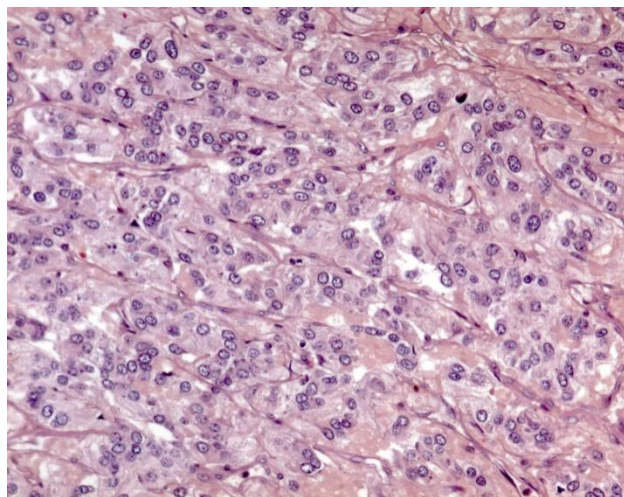
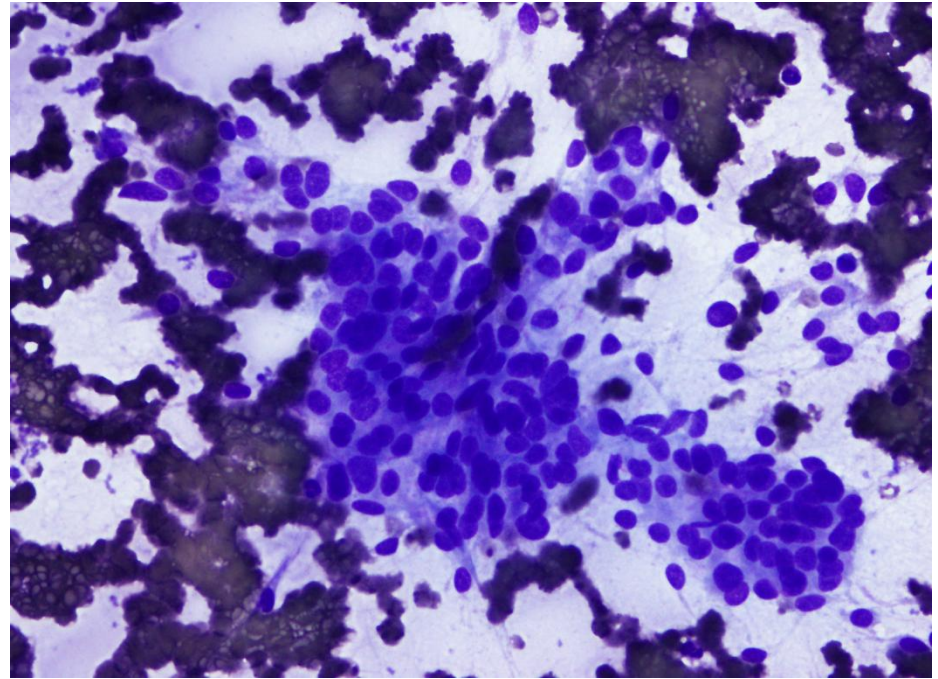
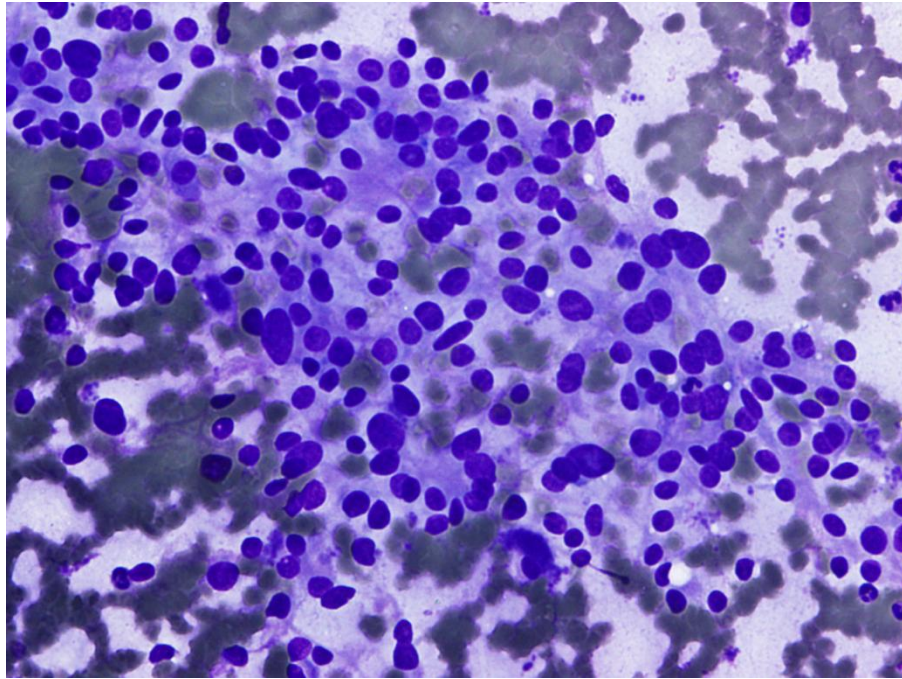
Zeppa P et al. Rapidly growing intraparotid mass in a young child. *J Craniofac Surg*. 2012;23:305-6.



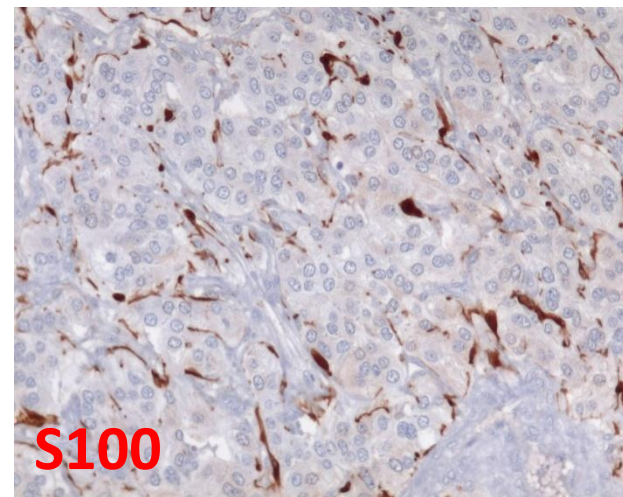
30 yrs, female, 20 mm right cervical nodule,
US: lymph node



carotid body tumor (paraganglioma)



chromogranin



S100

Carotid body tumor

95% benign, 50% +/- bilateral, often familial
prognosis depending on the size and the carotid vessels
involvement

- Rosa M et al. **Bilateral carotid body tumor**: the role of fine-needle aspiration biopsy in the preoperative diagnosis. *Diagn Cytopathol.* 2008;36:178-80.
- Naniwadekar MR et al: Fine needle aspiration diagnosis of carotid body tumor in a case of **multiple paragangliomas** presenting with facial palsy: a case report. *Acta Cytol.* 2010 ;54:635-9.
- Kieu V et al: Cervical **paraganglioma presenting as thyroid neoplasia**. *Otolaryngol Head Neck Surg.* 2012;146:516-8. Vora A et al: Paraganglioma with unusual presentation in parotid gland: A diagnostic dilemma in fine needle aspiration. *Cytojournal.* 2012;9:26.



Conclusions

- FNC is a fundamental diagnostic tool in H&N pathology
- FNC is effective, cheap, accurate and fast
- Rapid on-site evaluation enhance the FNC efficacy

Thank you!

