

The Role of Anatomic Pathology in Diagnosis of Lung Carcinoma

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Type of examination in Pathology

- **HISTOPATHOLOGY**

- Biopsies & surgical specimens

- **CYTOPATHOLOGY**

- Fine needle aspiration biopsy; Transthoracic needle aspiration; etc
- Specimens from other body sites (ascites, urine, pleural effusion, etc)

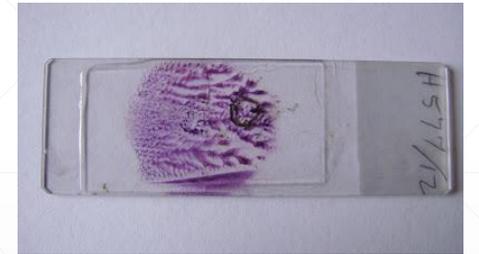
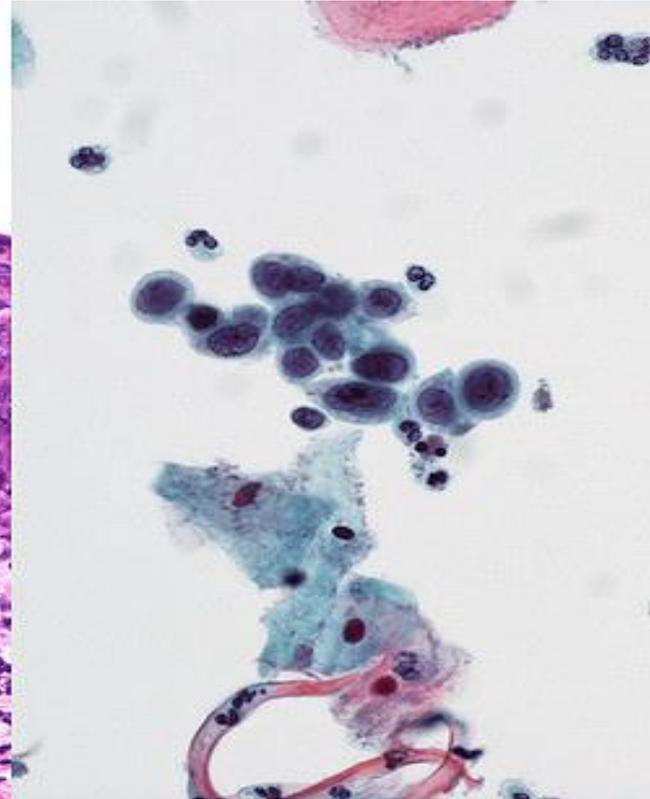
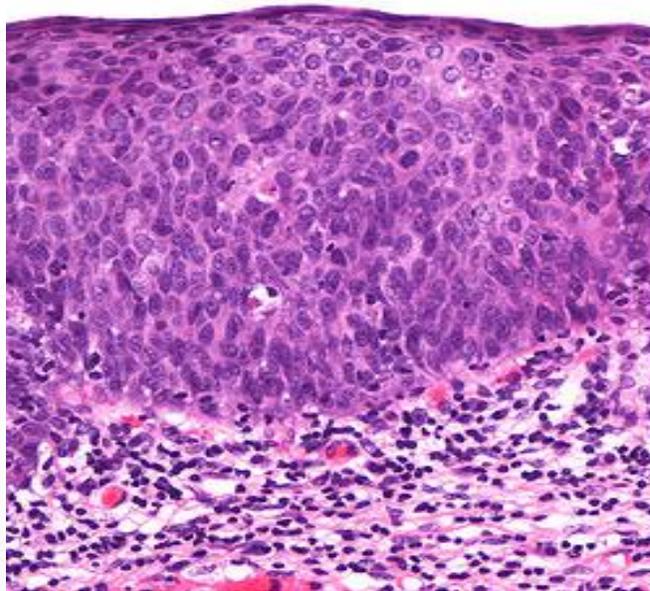
- **MOLECULAR PATHOLOGY**

- Gen-mutation (EGFR; ALK; ROS1; Kras; Nras; BRAF; PDL1)
 - Protein expression
-

Histopathology

Vs

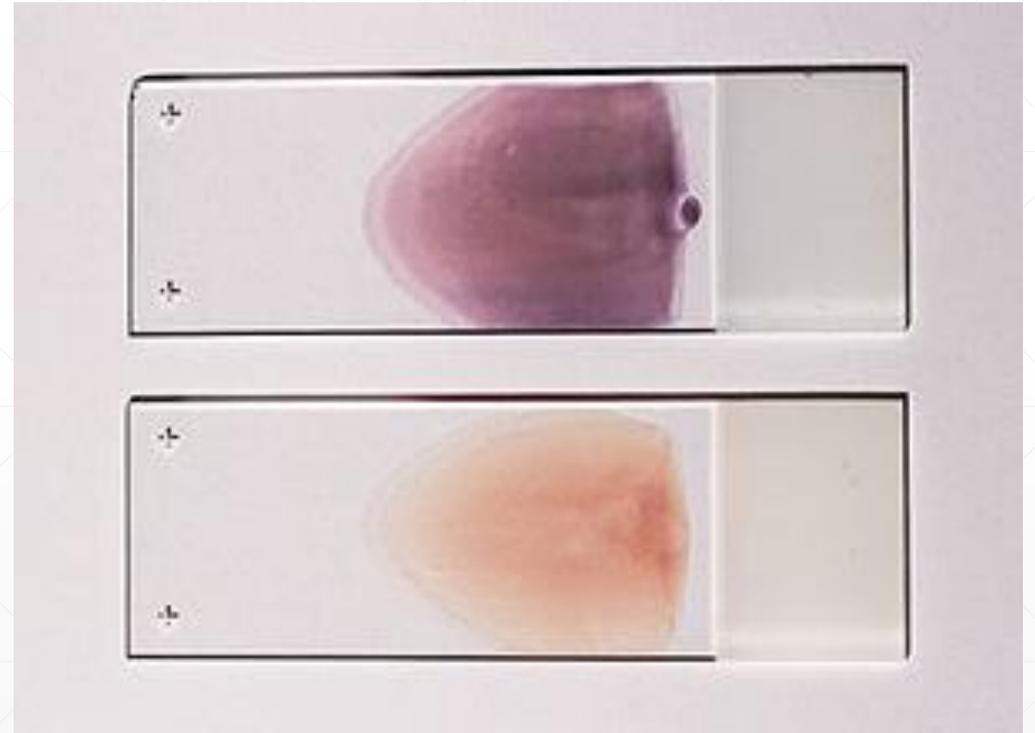
Cytopathology



Histopathology

Vs

Cytopathology

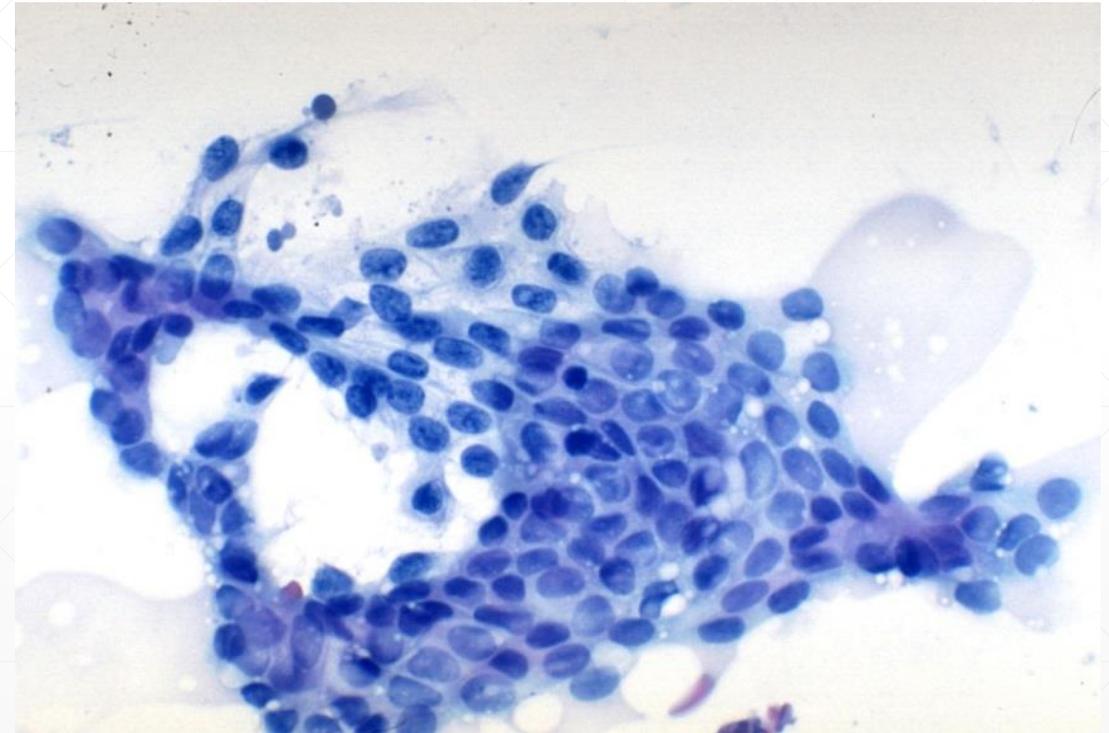
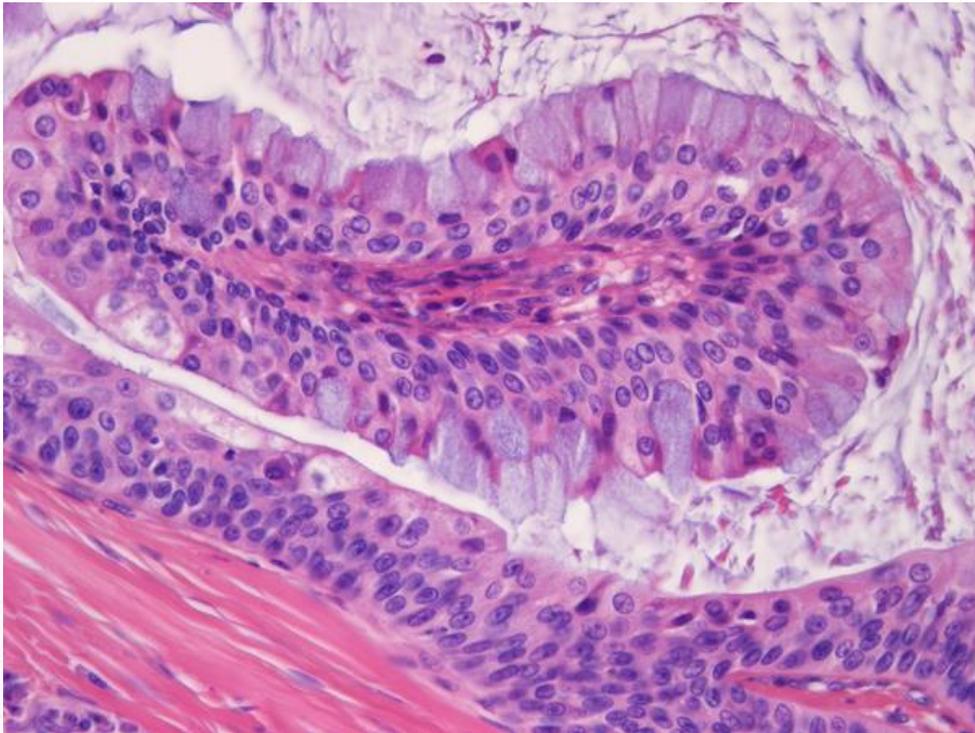


Source :
<https://www.google.co.id/search?biw=1366&bih=651&tbm=isch&sa=1&ei=px4gWrmZOoK6vwSwqYSwAg&q>

Histopathology

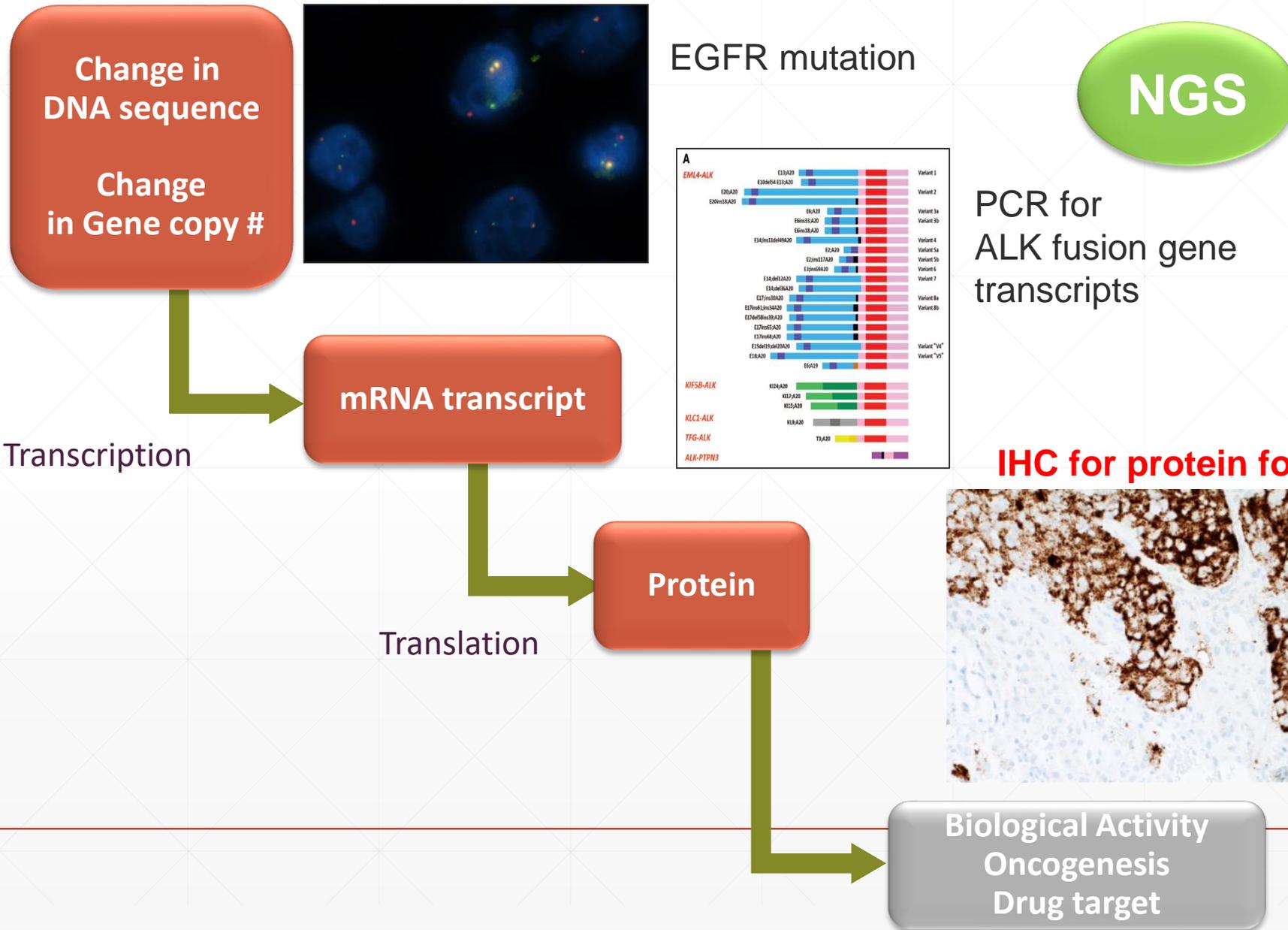
Vs

Cytopathology



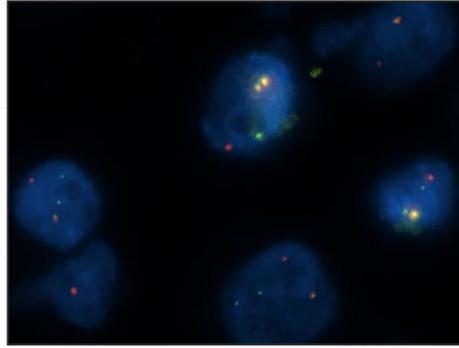
Source :
<https://www.google.co.id/search?biw=1366&bih=651&tbm=isch&sa=1&ei=px4gWrmZOoK6vwSwqYSwAg&q>

Molecular pathology

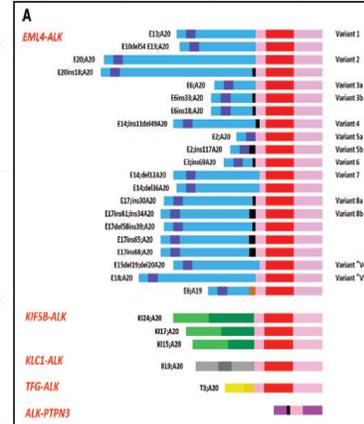


Change in DNA sequence

Change in Gene copy #



EGFR mutation



NGS

PCR for ALK fusion gene transcripts

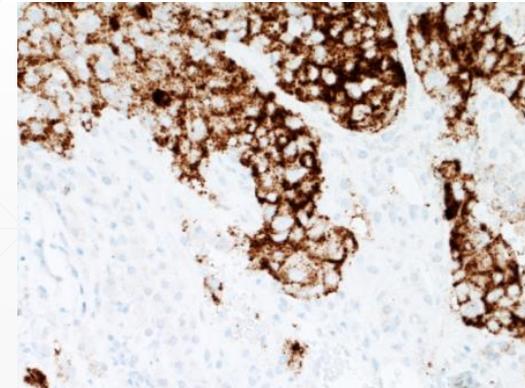
Transcription

mRNA transcript

Translation

Protein

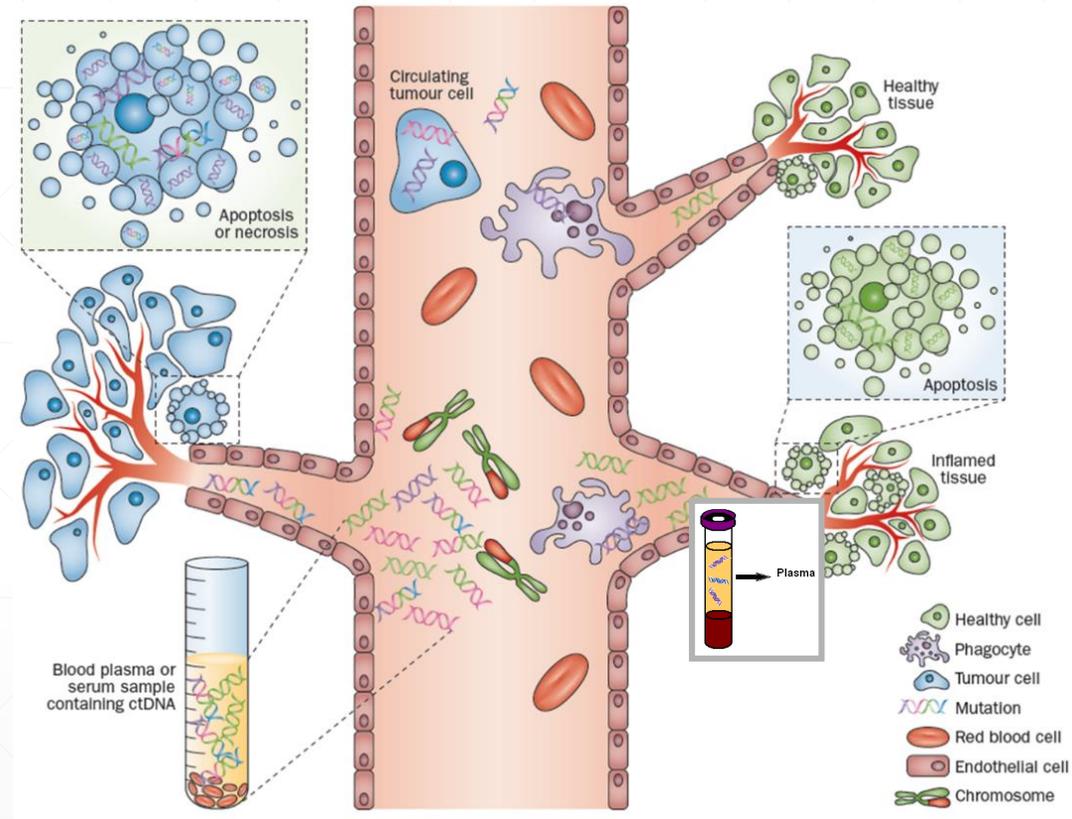
IHC for protein for PDL-1 expression



Biological Activity
Oncogenesis
Drug target

What is ctDNA (cfDNA)?

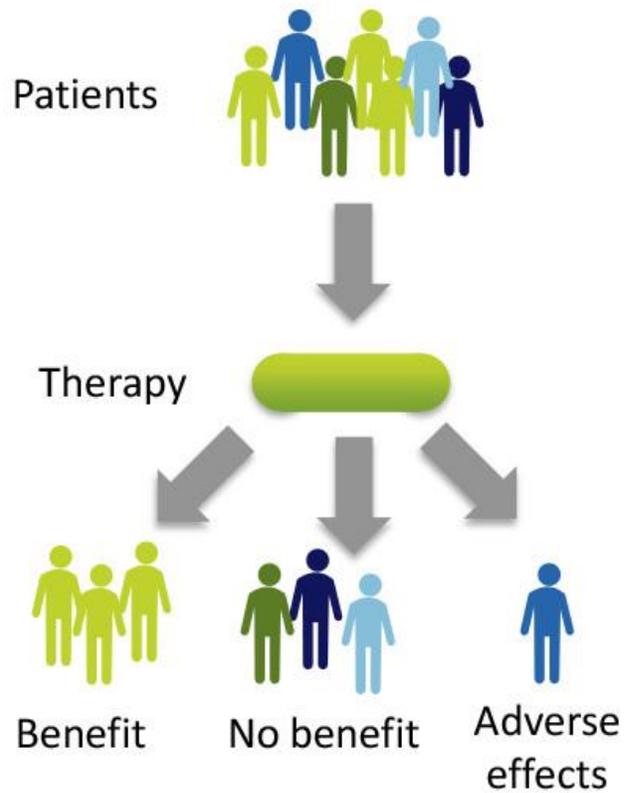
- ctDNA (also referred to as cfDNA)* is released from healthy, inflamed or diseased (cancerous) tissue from cells undergoing apoptosis or necrosis



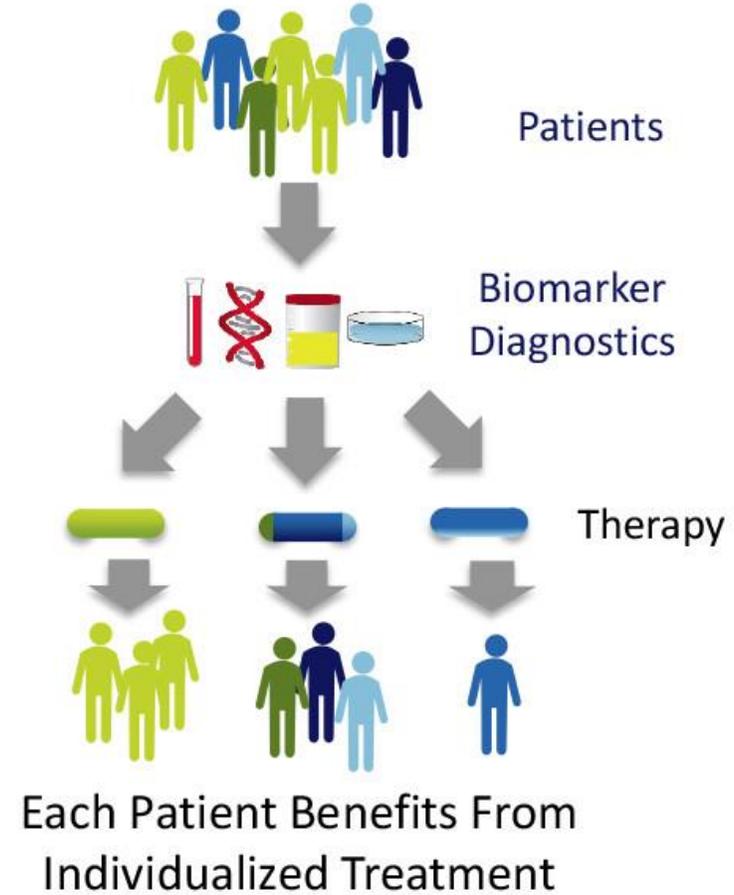
Crowley, et al. Nat Rev Clin Oncol 2013;10:472–484

* ctDNA = circulating free tumour DNA; cfDNA = circulating free DNA or cell free DNA.

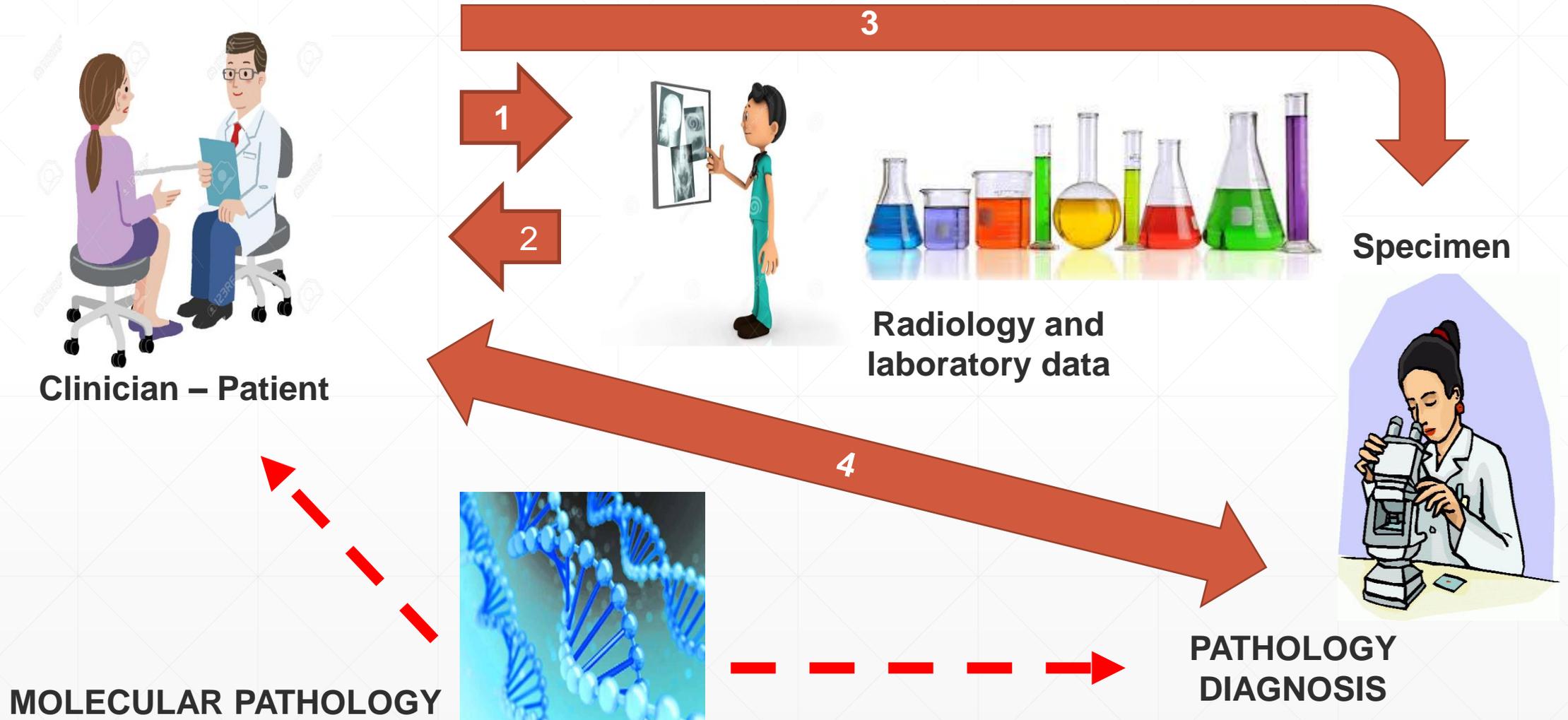
Without Personalized Medicine: Some Benefit, Some Do Not



With Personalized Medicine: Each Patient Receives the Right Medicine For Them



PROPOSE A GENERAL WORKFLOW OF LUNG SPECIMEN (TRIPLE DIAGNOSIS)



COMMUNICATION??



CLINICIAN / PULMONOLOGIST



PATHOLOGIST

HAPS HUNTER AREA PATHOLOGY SERVICE (IAPA)		LAB NUMBER: A-884	
PATIENT NAME: Joe	DOB: 24-06-85	PRACTICER NO: 12-1234	ICD9-CM: ICD9
RESIDENCE: 123 Street, WARRAH	POSTCODE: 2281	PATIENT ID: 12345678	WARDING: ICD9
DATE OF BIRTH: 1/1/2000	SEX: F	COLLECTION SITE: 1/1/2000	TIME: 2pm
CLINICAL NOTES: (Area for storage and time of collection)	LABORATORY: Blood	COLLECTION CENTER: ICD9	COLLECTOR: ICD9
Relevant Clinical Information	TESTS REQUESTED: Chromosome array / Karyotype	MOLECULAR: ICD9	URGENT: <input type="checkbox"/>
Medicine Assigned: 123456789	PHYSICIAN: Dr. A. HACKETT (IACA)	LABORATORY: ICD9	PHONE: ICD9
Pathologist Signature: [Signature]	WARATAH CAMPUS NSW 2281	DOCTOR'S NAME & DATE: Dr. A. HACKETT	LABORATORY: ICD9

Requisition form

Pekerjaan : _____

161:
PA-I

Periksa jaringan tubuh
Organ tubuh ini didapat dengan
Metode pemeriksaan : operasi / kerokan / seksi dsb.

Sal dari alat : APM

Direndam dalam : formalin 10%

Instansi Klinik : [Signature]

Perangan jelas tentang penyakitnya :
(mengirim kerokan rahim, hendaknya disebut tanggal haid yang terakhir)

[Signature]

Adapun penderita ini lebih dahulu belum / telah diadakan pemeriksaan Patologi, dengan
tgl. _____

Pemeriksaan ini bukanlah / adalah mengenai penderita partikelir yang dapat / tidak dapat me
a menurut klas _____ (_____) sebanyak Rp. _____

Jar 2x1x1 lahitanan Yogyakarta,
Dokter yang mengirim

Di : KEBUMEN

12 8 SEP 2017

aksisi percobaan / biopsi / kerokan / operasi seksi dsb.

[Handwritten notes]
- [Signature]
- [Signature]
- [Signature]

nya :
nya disebut tanggal haid yang terakhir)

lu / belum telah diadakan pemeriksaan oleh Bagian Patologi, yaitu nomor

Criteria for rejecting samples

- Sample label and patient name on the test request form do not match
 - **Insufficient patient information**
 - **Unlabeled sample (location site, margin, etc)**
 - Broken or leaking tube/container
 - Insufficient quantity (??)
-

PEMERIKSAAN JARINGAN TUBUH
 Jaringan didapat dengan : eksisi percobaan/biopsi/operasi/kerokan/seksi *)

Berasal dari : TMA CT Guided

Direndam dalam : (umumnya digunakan formalin 10%/Alkohol 95%)

Diagnosa Klinik : massa paru sinistra metastasis
leukemia

Keterangan penyakit penderita (jika mengirimkan kerokan rahim, hendaknya disebutkan tanggal haid terakhir)

multiple nodul
 Adeno
 curiga Adeno
 Carcinoma
 Adalah form
 lagi yg lar
 seperti gamb
 Bronchioloalveola
 carcinoma

ap penderita ini, belum/pernah *) dilakukan pemeriksaan patologi.

nomor tgl Diagnosa PA

08 JUL 2017

7/7 - 2017
 Dokter pengirim

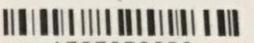
- Nama, usia, jenis kelamin, alamat
- Diagnosis klinis
- Pemeriksaan radiologi/lab pendukung
- Lokasi pengambilan lesi
- Deskripsi lesi
- Label jaringan (kanan/kiri, nama organ dll)
- Nama dan nomor telp dokter pengirim



bagian / Spesialis :

PERMINTAAN PEMERIKSAAN HISTOLOGI DAN PATOLOGI

HISTOPATOLOGI DAN SITOLOGI SMEAR


 1707030026
 01600071915
 UKAR SUARNA, TN/L / 65 Tahun
 2017270619/RSPG CISARUA

ANG DIMINTA

Hormonal Infertilitas Keganasan
 an jaringan :
 Biopsi Ekterpasi Kerokan Operasi

Hormonal Postmafuritas Infeksi Keganasan
 an :
 Vaginal Exocervical Endocervikal Endometrial
 Sekret puting susu / nipple discharge

nah diperiksa sitologi / P A sebelumnya ? () Ya / tidak, dimana
 yang lalu :

:
 :

: Keluhan utama dan riwayat perjalanan penyakit
 Ya lamanya hari siklus hari teratur / tidak
 Tidak hamil Hamil Post partum Menoupis GPA
 Pil IUD Suntikan KB alami

:
 :
 :

7/9/15
 87
 05 JUL 2017
 Bogor, 3-7-2017

- Nama, usia, jenis kelamin, alamat
- Diagnosis klinis
- Pemeriksaan radiologi/lab pendukung
- Lokasi pengambilan lesi
- Deskripsi lesi
- Label jaringan (kanan/kiri, nama organ dll)
- Nama dan nomor telp dokter pengirim



TAHAP-TAHAP PEMERIKSAAN PA

HASIL PEMERIKSAAN PA



PENYEDIAAN MATERI (PREPARAT)



PENGELOLAAN DAN PENGIRIMAN SAMPEL
(KAMAR OPERASI / R. TINDAKAN)



DI LUAR LAB. PA

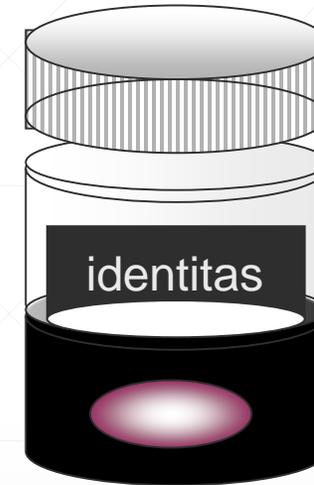
FIKSASI JARINGAN

- Definisi: proses perendaman jaringan dg cairan fiksasi yang bersifat stabil (fisik dan kimia) untuk mempertahankan struktur sel dan jaringan → struktur jaringan & sel menetap
- Jaringan diambil → suplai darah terputus → proses dekomposisi

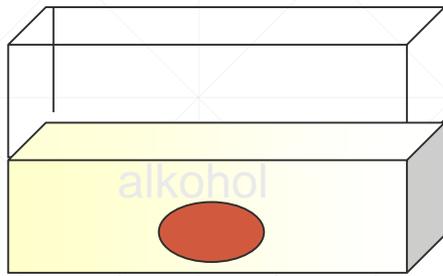
BUKAN SEKEDAR MENGAWETKAN!!

Kesalahan fiksasi → hasil sia-sia jerih payah para klinisi

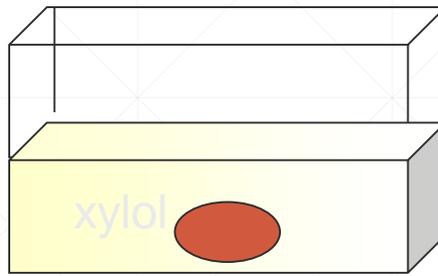
- **Bahan fiksasi :**
 - Jaringan : formalin 10% + buffer
 - Toleransi antara 8-12%
 - Daya penetrasi formalin 1mm/ jam
 - Dilakukan pada suhu kamar
 - Perbandingan jaringan : formalin
= 1 : 10-20



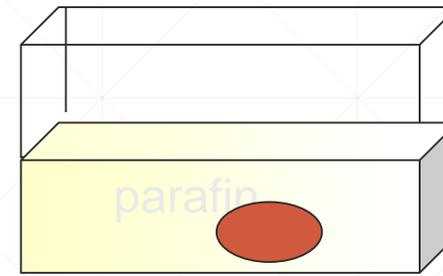
Tissue processing: 18 h



dehidration

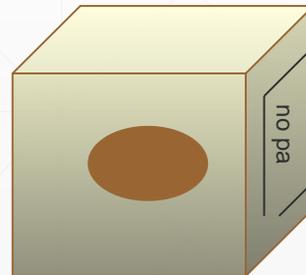


clearing



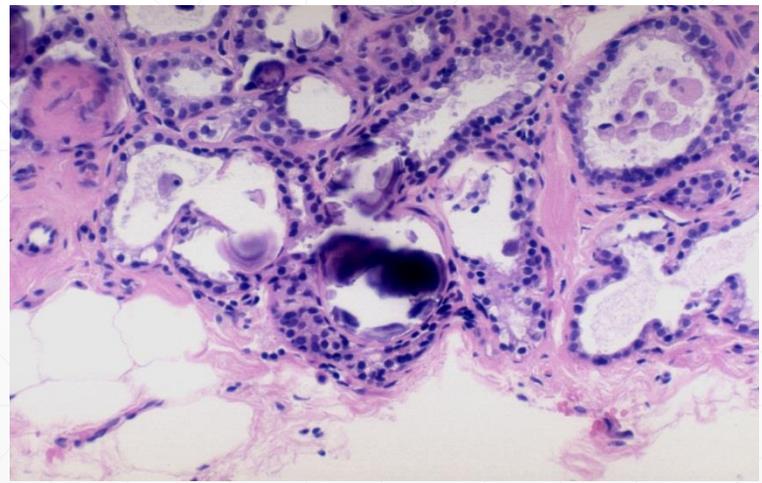
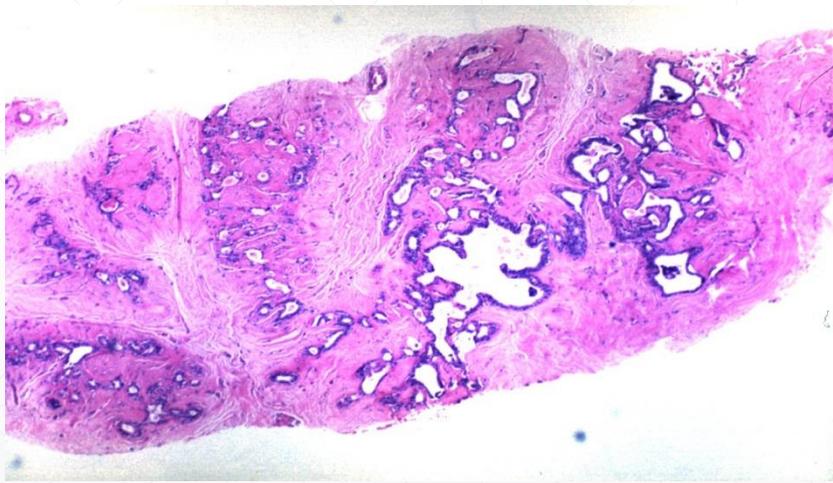
infiltration

Tissue embedding



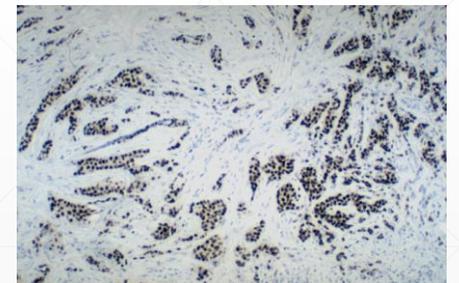
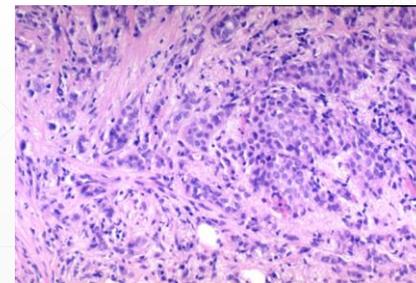
Paraffin block

Paraffin block

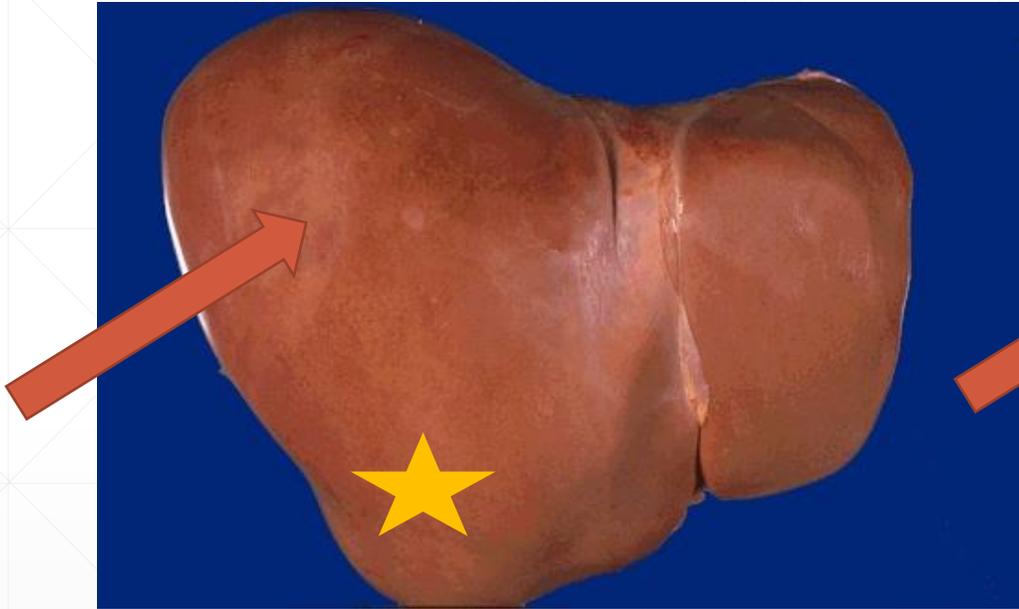


Reaching a Final Diagnosis

- Pathologist diagnosing slides may request:
 - Additional clinical information
 - **Additional tissue samples or recut slides**
 - **Special stains to help determine benign vs. malignant or tumor type**
- Other pathologists may be asked to review slides
 - **Daily Departmental Consultation Conference**
- Final diagnosis typed & electronic sign-out



Tumor can be heterogenous !!



Discordance between clinical and pathology

INITIATE A GOOD COMMUNICATION



CLINICIAN



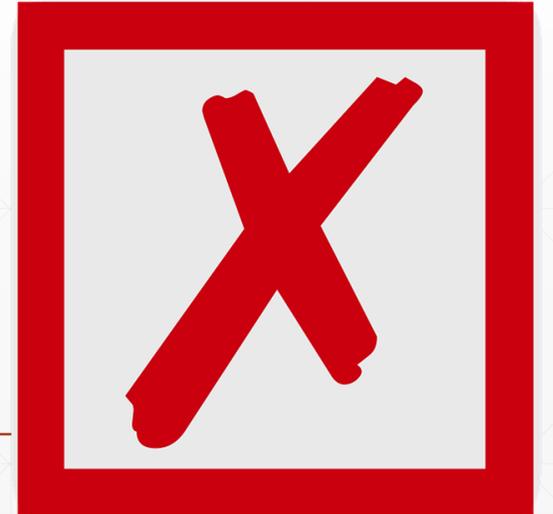
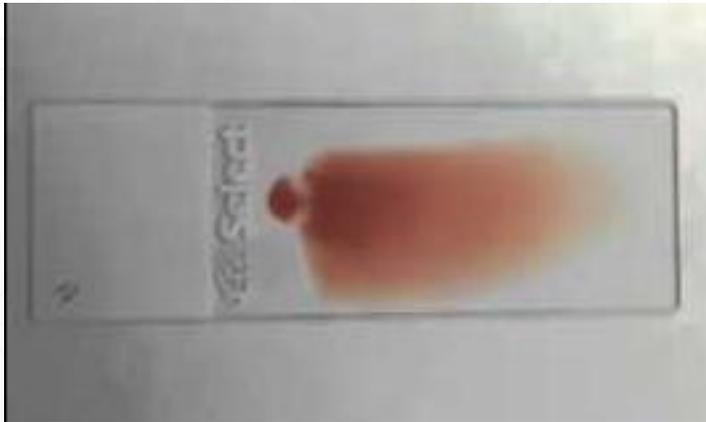
PATHOLOGIST



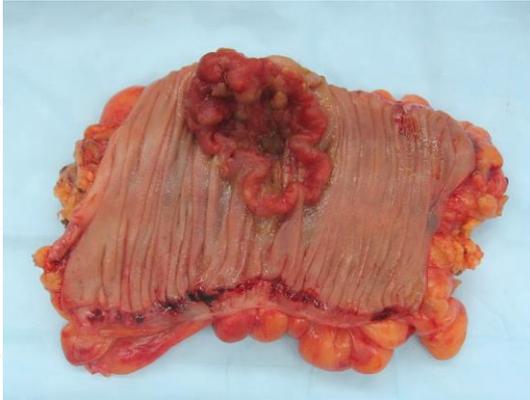
(RAPID ON SITE EXAMINATION / ROSE)



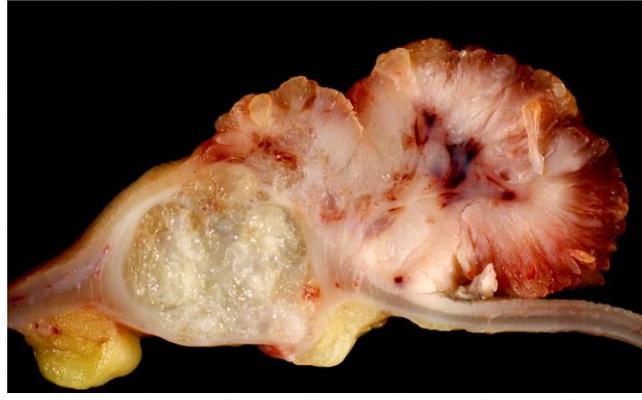
Providing good specimens (1)



Providing good specimens (2)



TUMOR 1



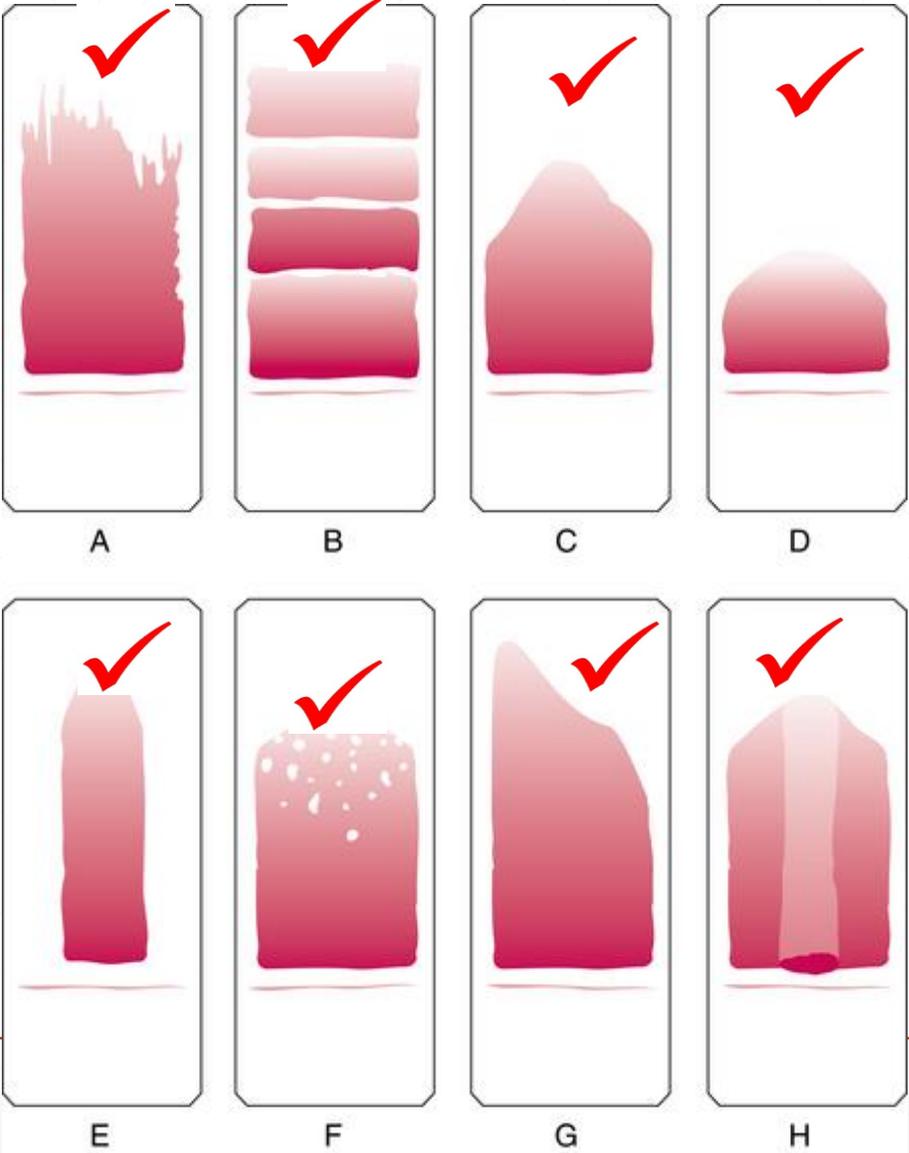
TUMOR 2



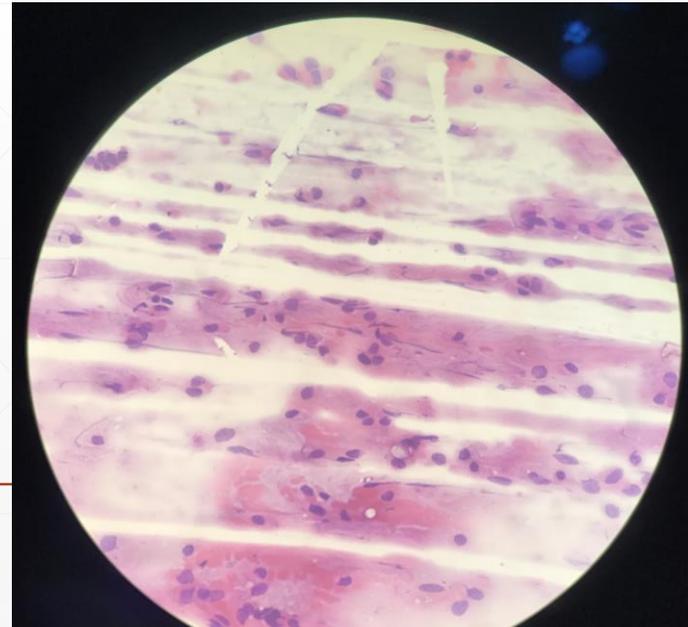
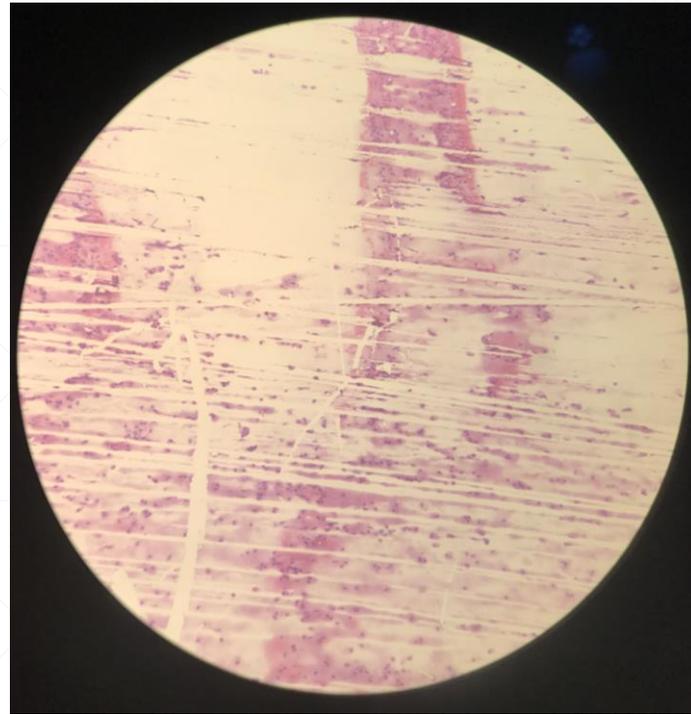
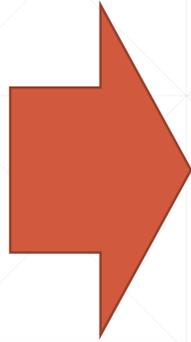
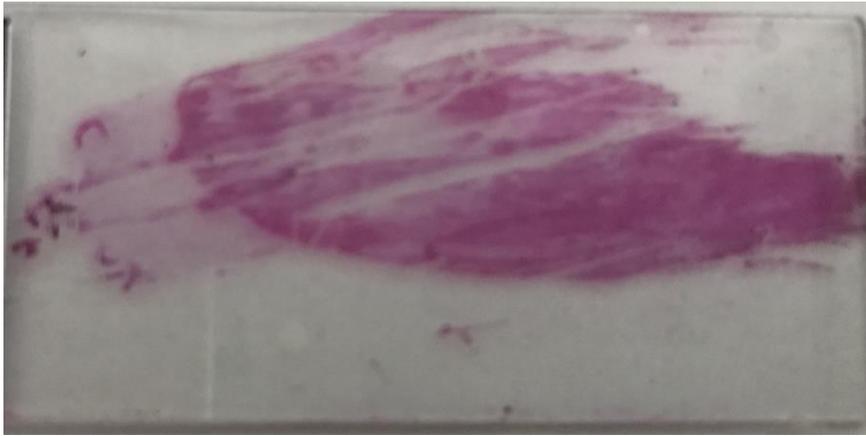
TUMOR 3



Providing good specimens (3)



Providing good specimens (4)



Providing good specimens (5)



FIXATIVE !!!

CAIRAN FIKSASINYA

- Cairan tubuh (cairan pleura, asites dll) : Alkohol 50% (aa)
 - AJH/BJH/FNAB : metanol - cat giemsa
Alkohol 95% - cat papaniculou
-

Metode Baru dan Sederhana Untuk Persiapan, Pelaksanaan, Dan Penggunaan Blok Sel

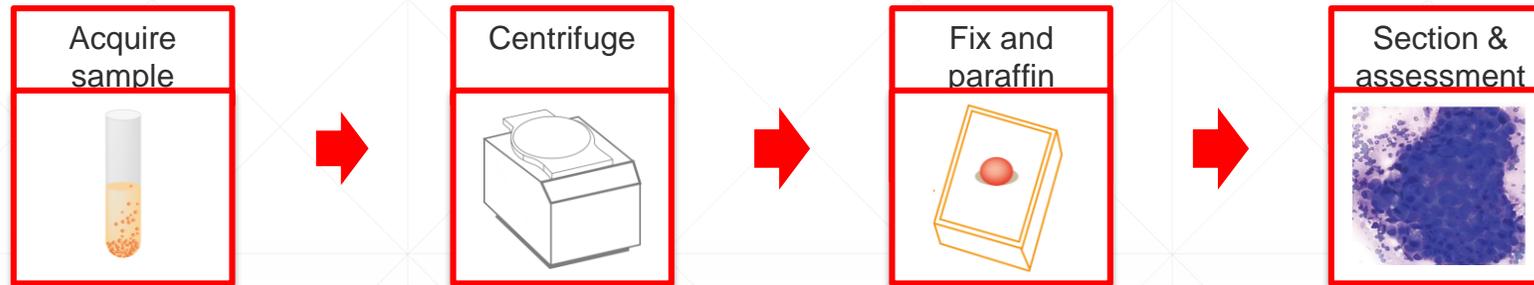
*Kathryn G. Lindsey, MD; Patricia M. Houser, MHS, CT
(ASCP); Wanda Shotsberger-Gray, HT/HTL (ASCP);
Olga S. Chajewski, MD; and Jack Yang, MD
Department of Pathology and Laboratory Medicine,
Medical University of South Carolina, Charleston, South
Carolina
October 14, 2016*

What is Cell Block ?



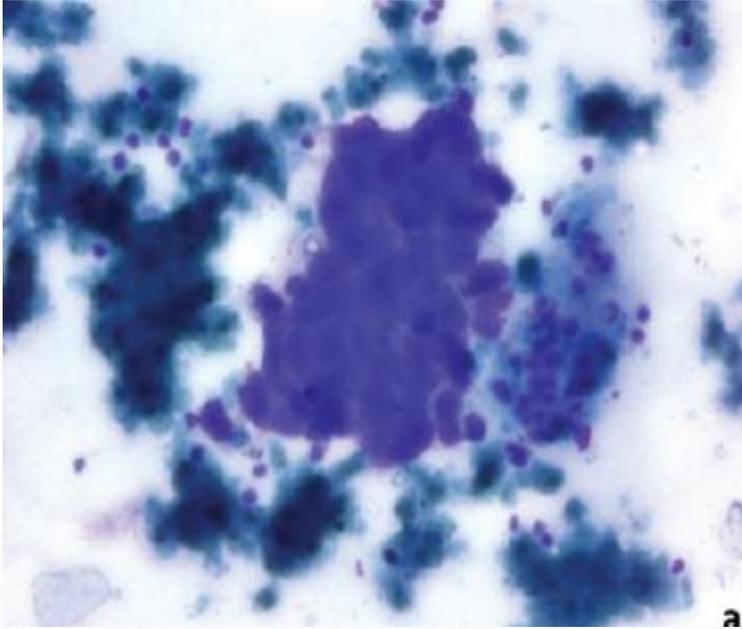
- Cell Block: micro biopsies embedded in paraffin that broaden the diagnostic value of cytology specimens and are complimentary to cytology preparations
 - It employs retrieval of small tissue fragments from cytological specimens which are processed to form a paraffin block
 - Cell blocks offer the opportunity to examine the histological structure and allows the use of ancillary tests
-

The basic principles for the preservation and processing of a cytological sample into a cell block

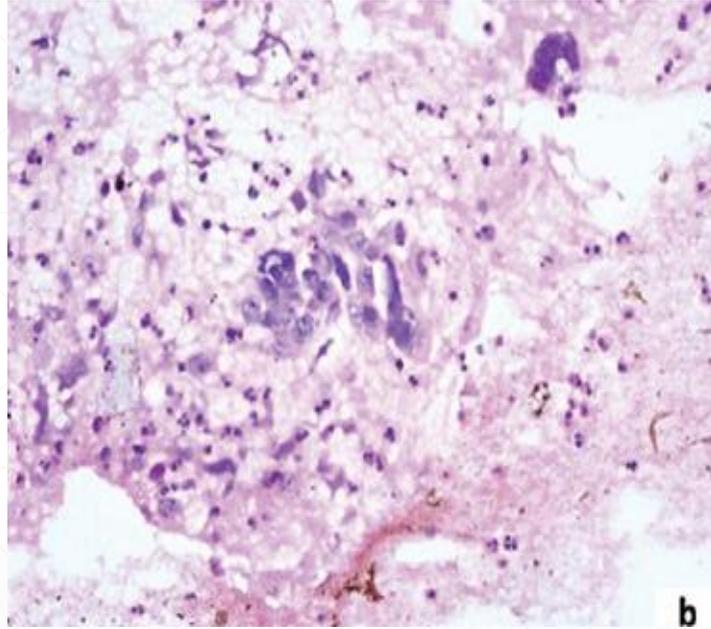


The most challenging component of the cell block preparation is transferring the cell pellet for paraffin embedding

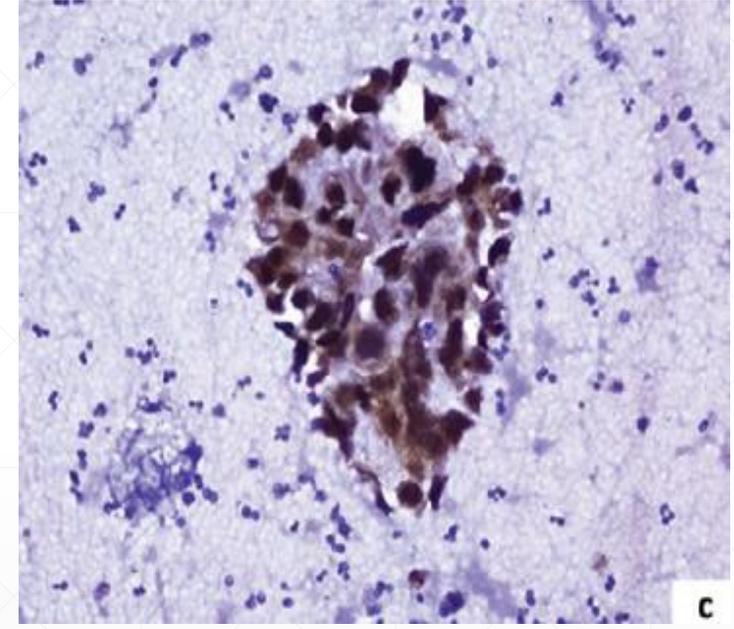
Cell Block (Adenocarcinoma)



Tumor cell cluster of pulmonary adenocarcinoma

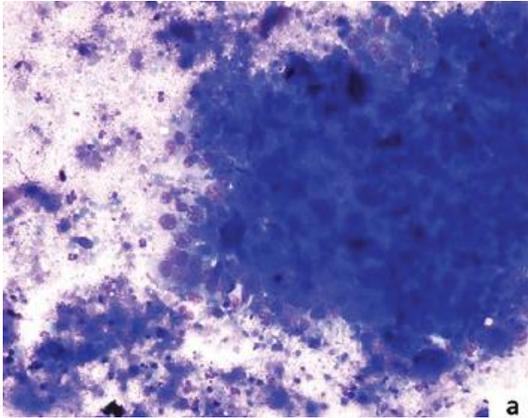


Cell block: a cluster of tumor cells (HE)

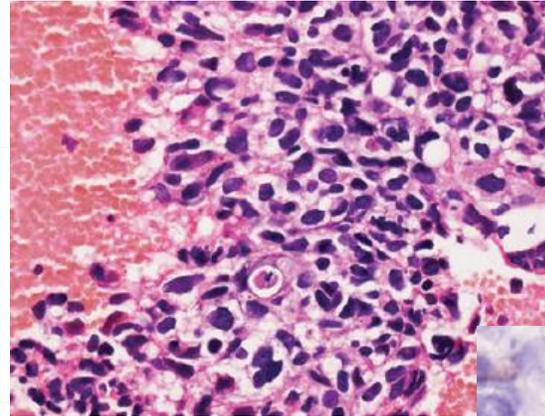


Nuclear positivity for TTF-1 (IHC)

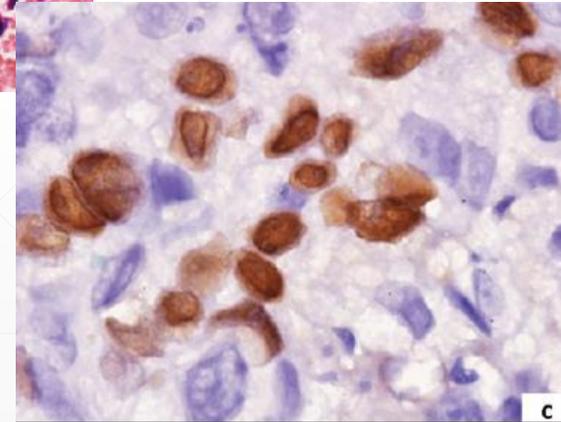
Cell Block (SCC)



Tumor cell cluster with necrosis in the background

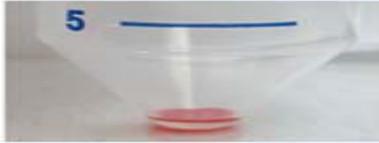
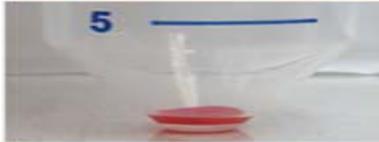


Cell block: squamoid differentiation

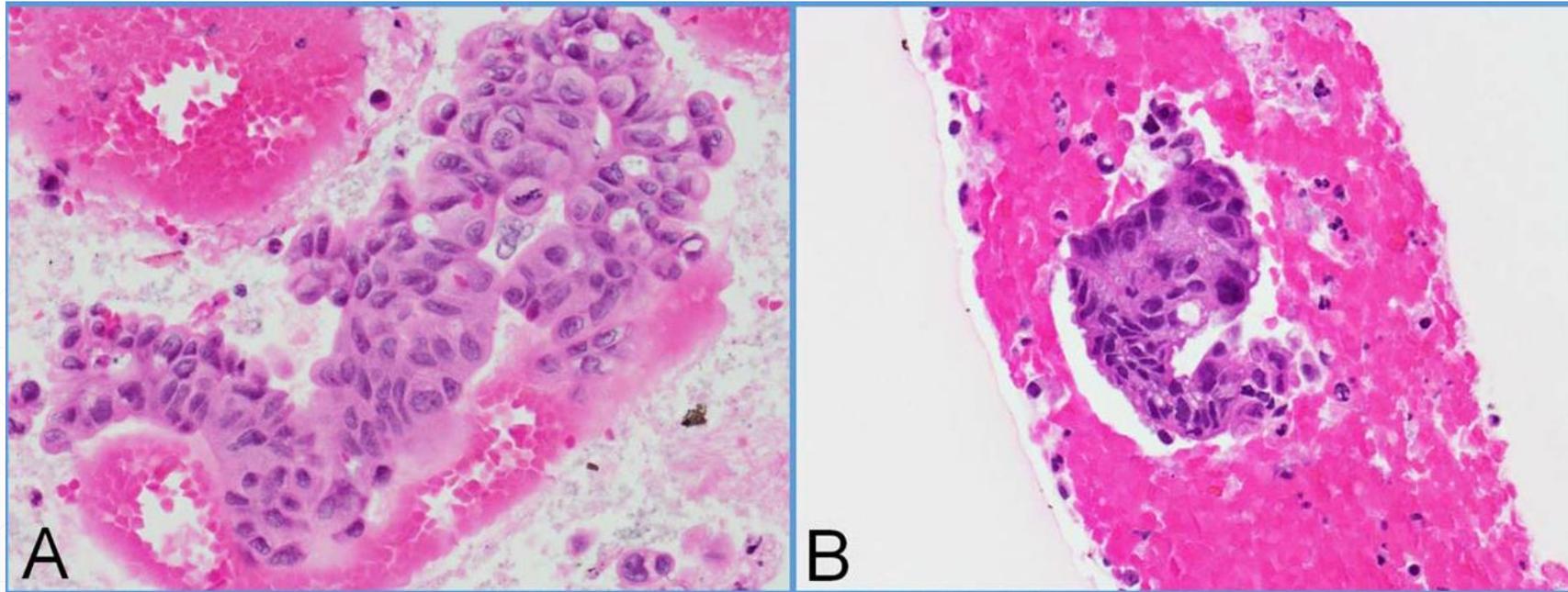


Nuclear positivity for IHC

Gambar Referensi Ukuran pelet dan hasilnya

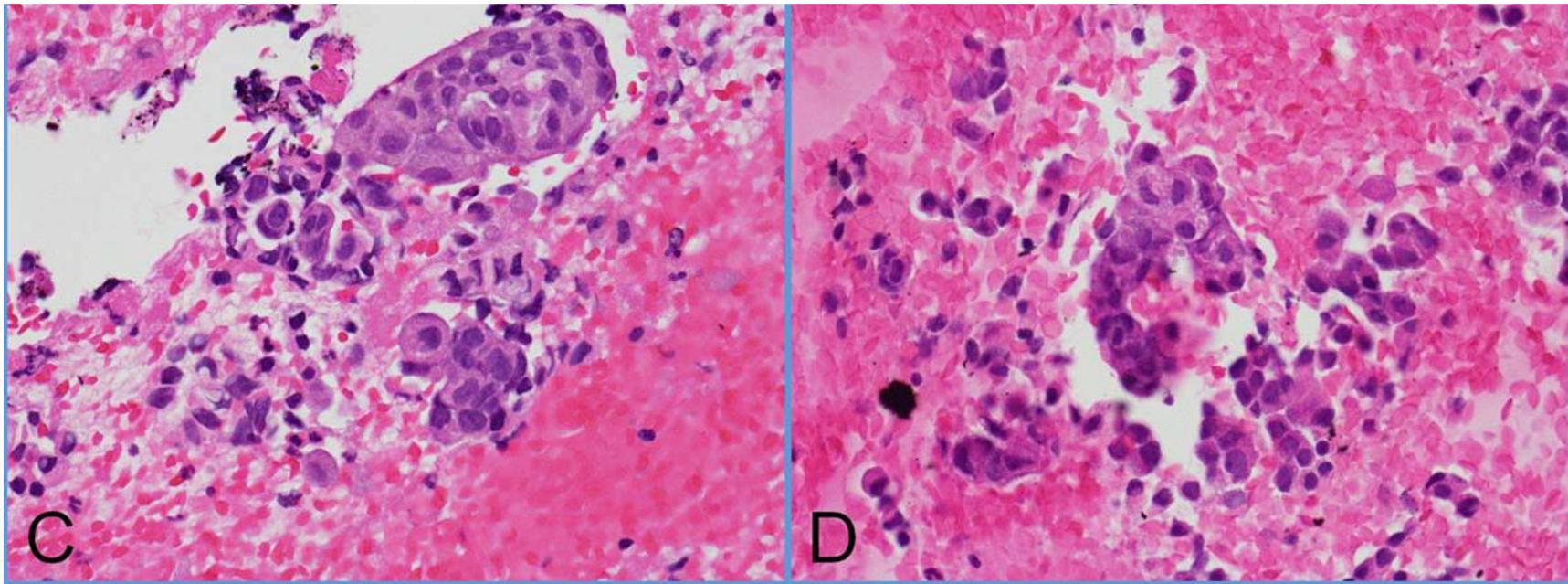
Reference Image	Cell Button Score	Number of Cases	Correlated with Final
Button barely visible	Scant	76	40 (53%)
	0.1	137	99 (72%)
	0.2	94	82 (87%)
	0.3	25	23 (92%)
	0.4-0.5	17	16 (94%)
	0.6-0.8	3	3 (100%)

Hasil perbandingan histologi blok sel dari spesimen *FNA / cairan*



EUS –FNA adenokarsinoma

Hasil perbandingan histologi blok sel dari spesimen *FNA/AJH*



EUS –FNA adenokarsinoma

ALKOHOL BUKAN UNTUK FIKSASI HANYA UNTUK MENGUMPALKAN

Blok Sel merupakan pusat sitologi pada masa yang akan datang

Blok sel mempunyai sensitivitas dan spesifitas tinggi

Interdisciplinary Patient Management

- Pathologists are members of each patient's healthcare team
 - Daily consultation, weekly Tumor Board and weekly Breast Cancer Conference
 - Radiology, Pathology, Surgery, Medical Oncology, Radiation Oncology etc.
 - The pathologist's diagnosis helps determine prognosis and which patients will benefit from additional therapy and/or evaluation
 - Additional surgery, radiation therapy, chemotherapy, hormonal therapy, genetic testing
-

Thank You

