Establishment of Patient-derived Pancreatic Cancer Organoid using Endoscopic Ultra Sound-guided Fine Needle Aspiration

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Disclosures

There is no conflict of interest in this study

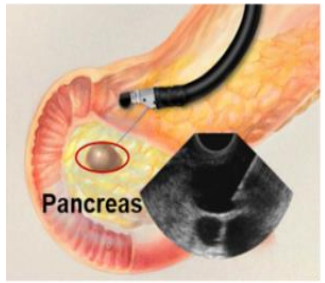
Purpose of Study

1. Establishment of patient-derived pancreatic cancer organoid from EUS-FNA &
2. Confirmation of their clinical applicability

Establishment of Organoids using EUS-FNA

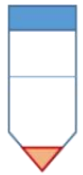
EUS-FNA for r/o pancreatic cancer (SNUH, Jan ~ Dec, 2017)

*** Single needle pass with 15 to-and-fro movement**

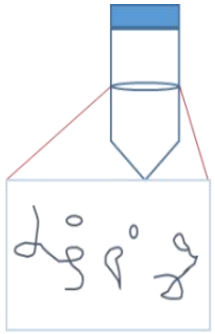


EUS-FNA

FNA biopsy arrives < 24hr

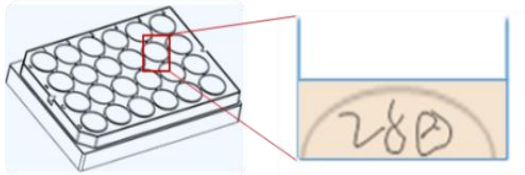


Washing with DPBS (x3)

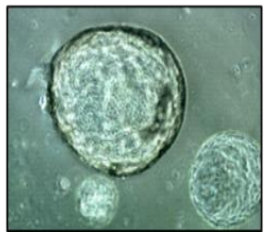


Gentle cell dissociation

Seed cell on 24-well plate with matrigel



Organoid culture in complete media



***Established organoids:**
More than 5 passages of growth

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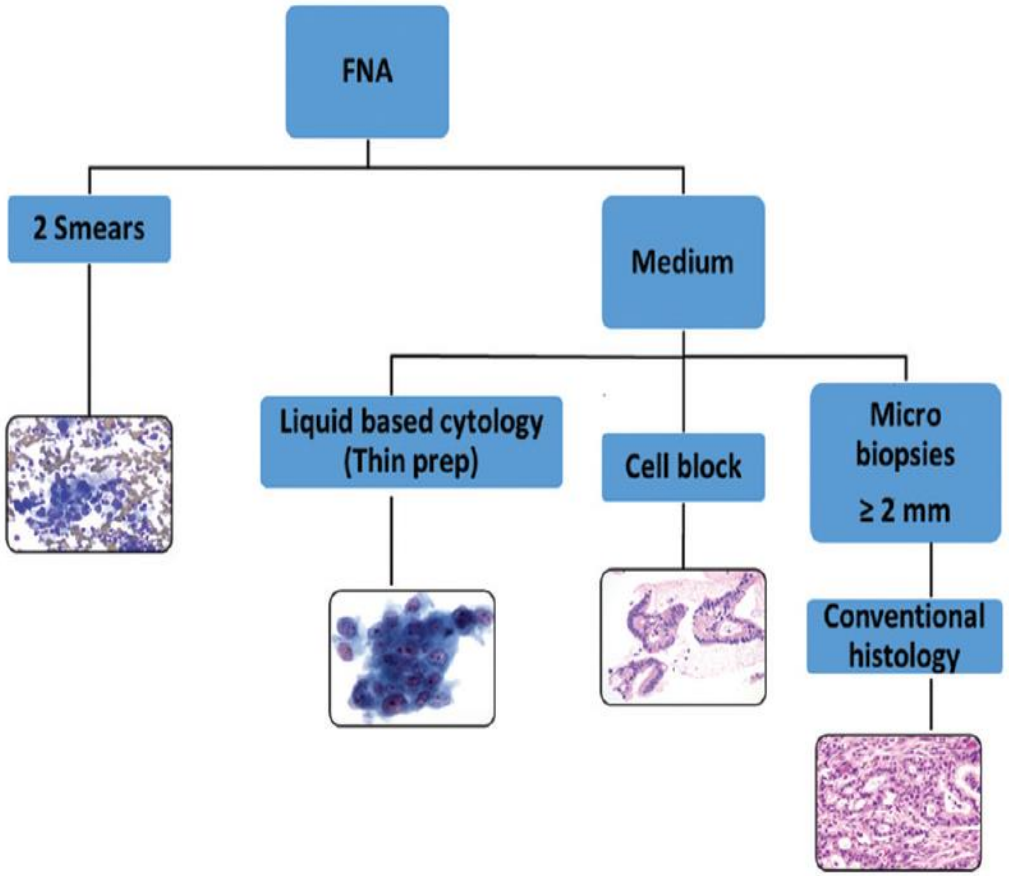
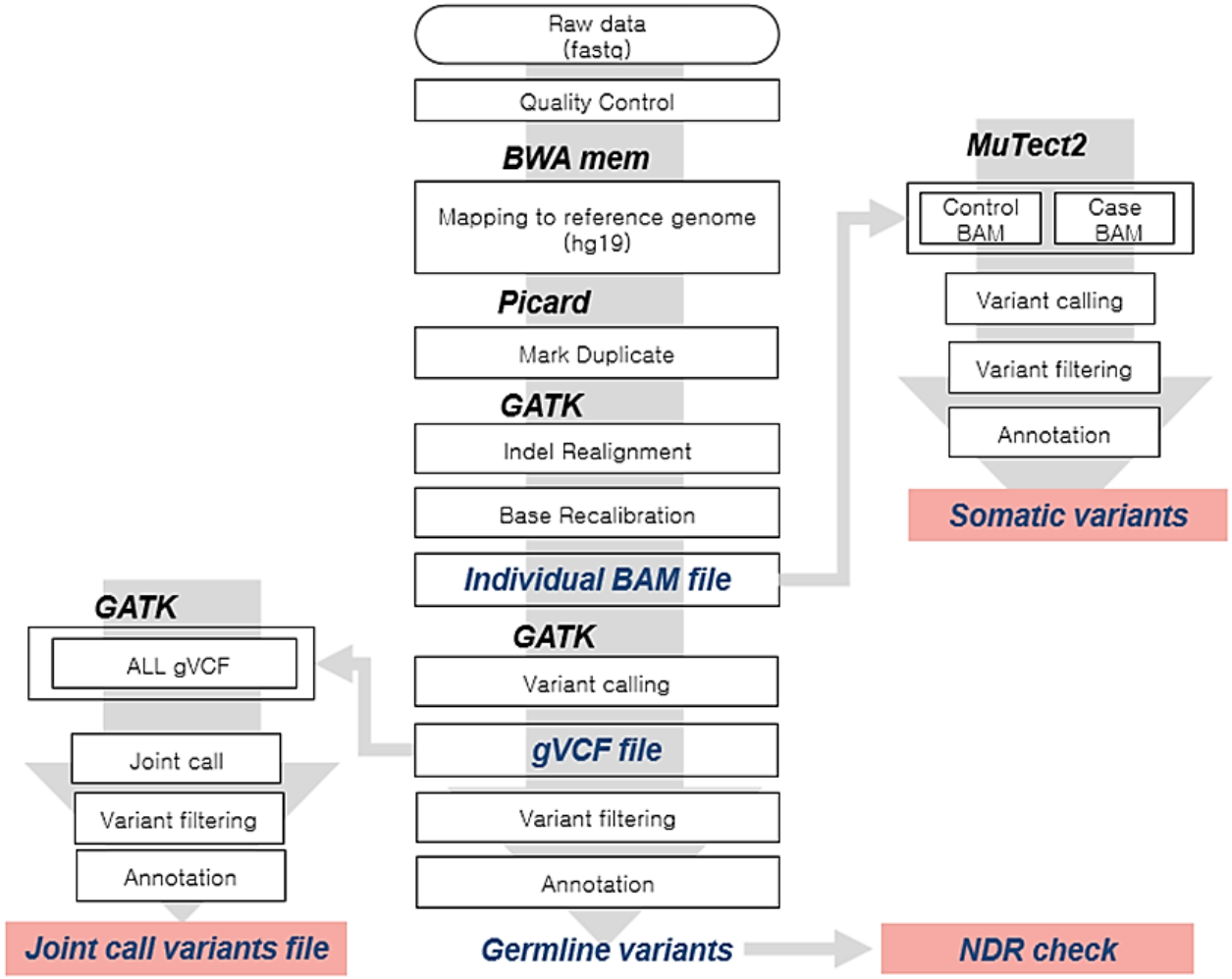
Methods

Pathology evaluation



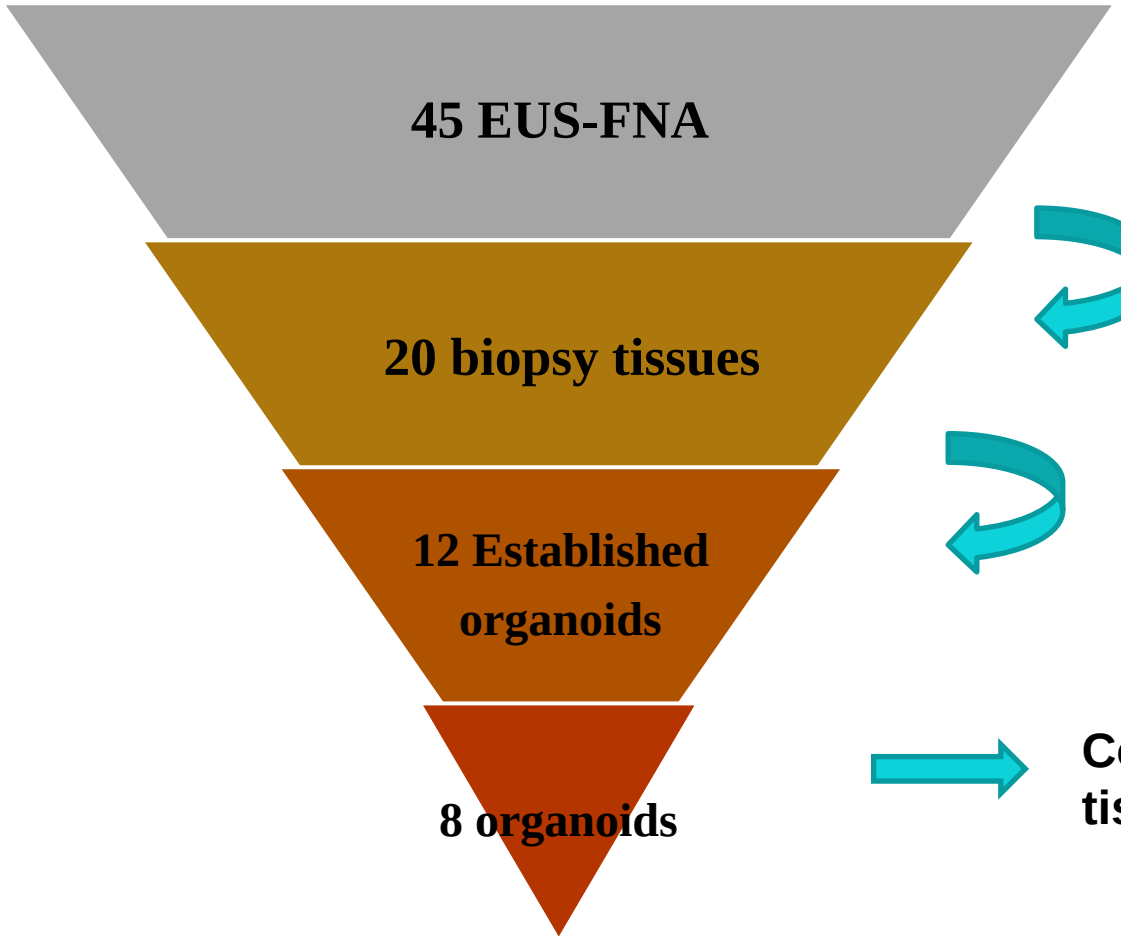
Whole Exome Sequencing



NDR (Non-reference Discordance Rate)*

$$* NDR\ score = \frac{\text{hom\_nonmatch} + \text{het\_nonmatch}}{\text{hom\_match} + \text{hom\_nonmatch} + \text{het\_match} + \text{het\_nonmatch}} \times 100\%$$

Flow Chart of the Study



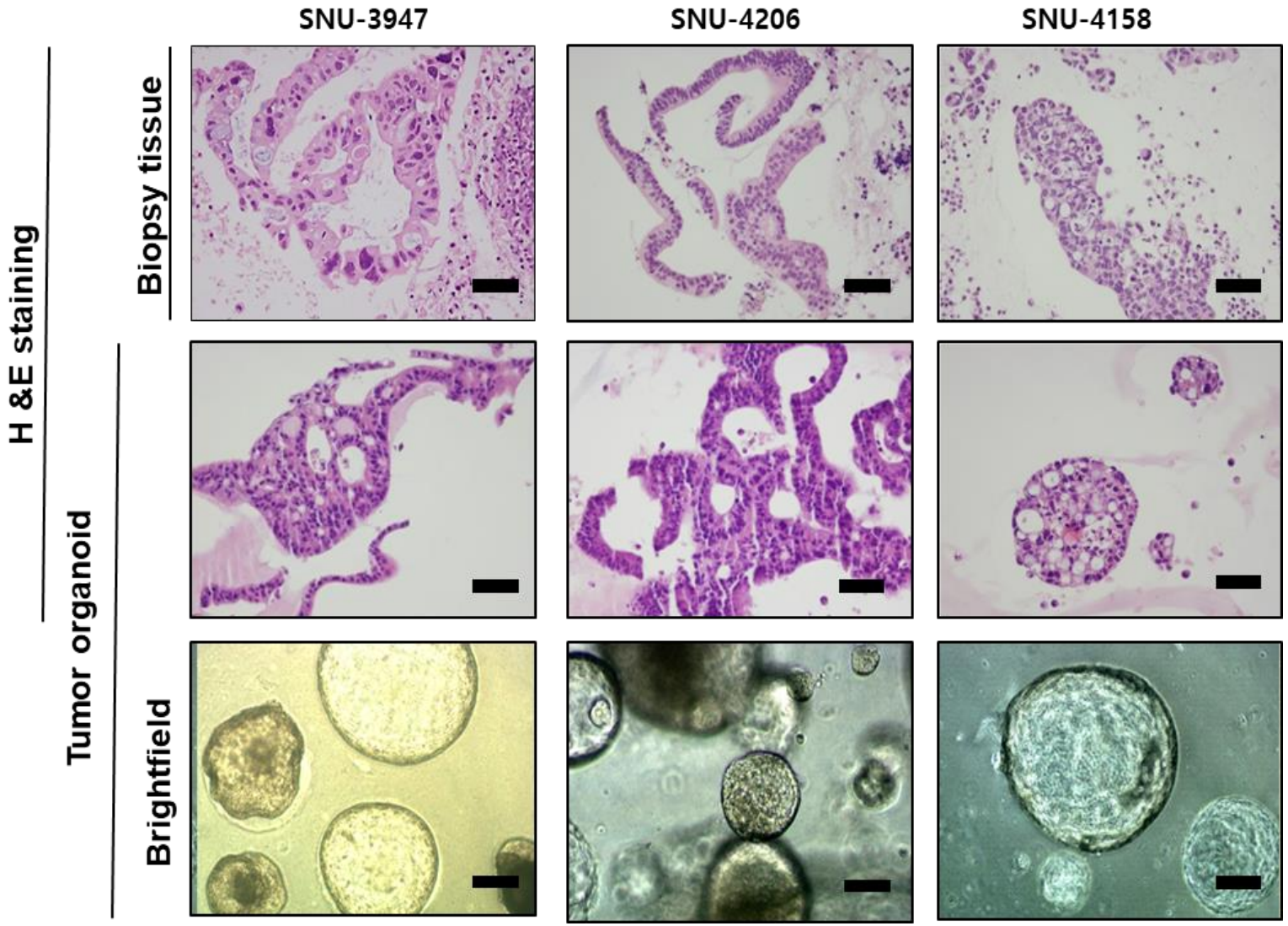
Except for inadequate samples

Established organoids

(≥5 passages) ➔ 60%

Comparison between core biopsy tissues and organoids (8 pairs)

Histological comparison



Core biopsy tissue

Tumor organoid

Morphological similarity

Scale bars, 400μm

Mutational comparison from NGS

Reflect the genetic mutation (~ 90% homology)

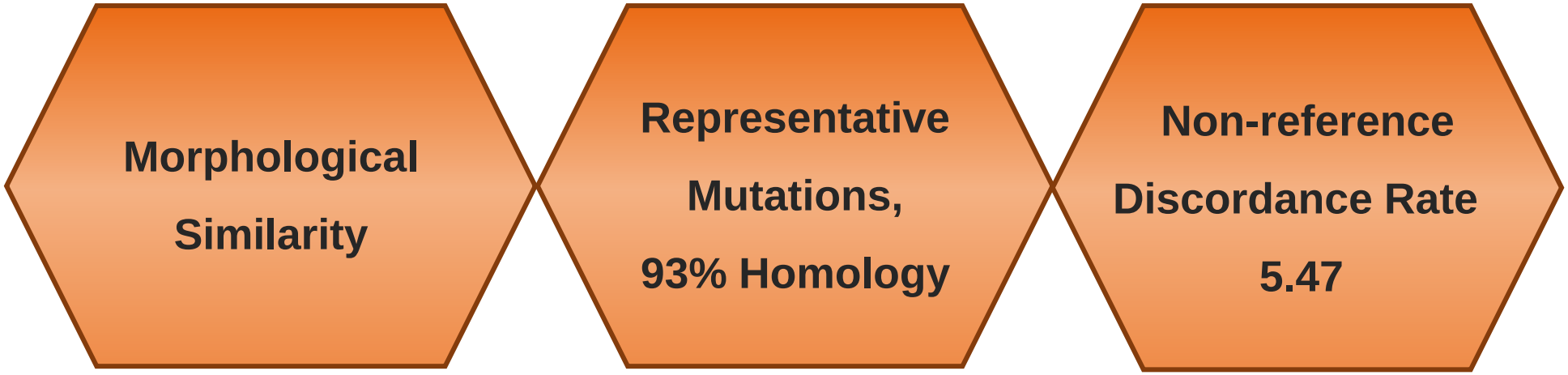
Non-reference Discordance Rate

Biopsy tissue	Organoid	homo-match	homo-nonmatch	het-match	het-nonmatch	NDR*
3947-T	3947-TO	37,703	407	41,375	5,161	6.58
4158-T	4158-TO	38,252	272	43,345	4,266	5.27
4208-T	4208-TO	38,464	385	39,069	5,583	7.15
4309-T	4309-TO	37,192	1,208	40,724	1,336	3.16
4354-T	4354-TO	38,213	381	43,184	3,665	4.74
4365-T	4365-TO	38,771	277	44,183	4,438	5.38
4425-T	4425-TO	39,074	220	43,149	4,742	5.69
4607-T	4607-TO	38,451	1,210	39,854	3,614	5.8

* NDR less than 1%: two samples are equal
NDR more than 30%: two samples are different

Median NDR 5.47 (range 3.16 – 7.15)

Pancreatic cancer organoid model



Established organoids from EUS-FNA core biopsies

can be a useful model system for pancreatic cancer research