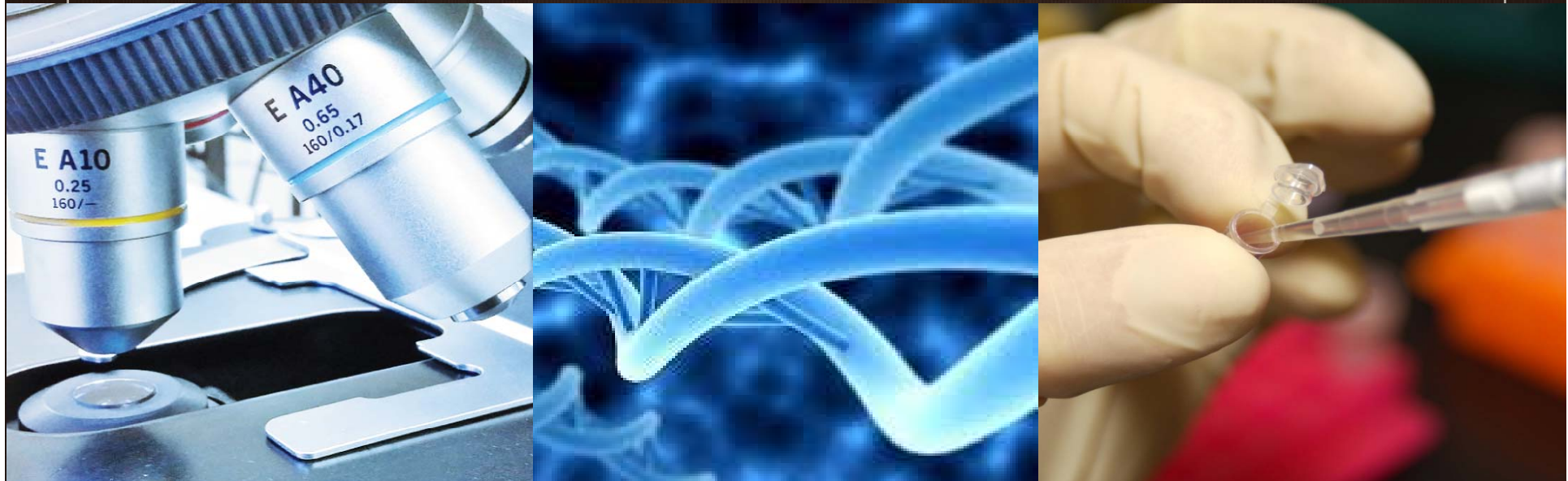




Mahidol University
Faculty of Medicine
Siriraj Hospital

Cancer Precision Medicine

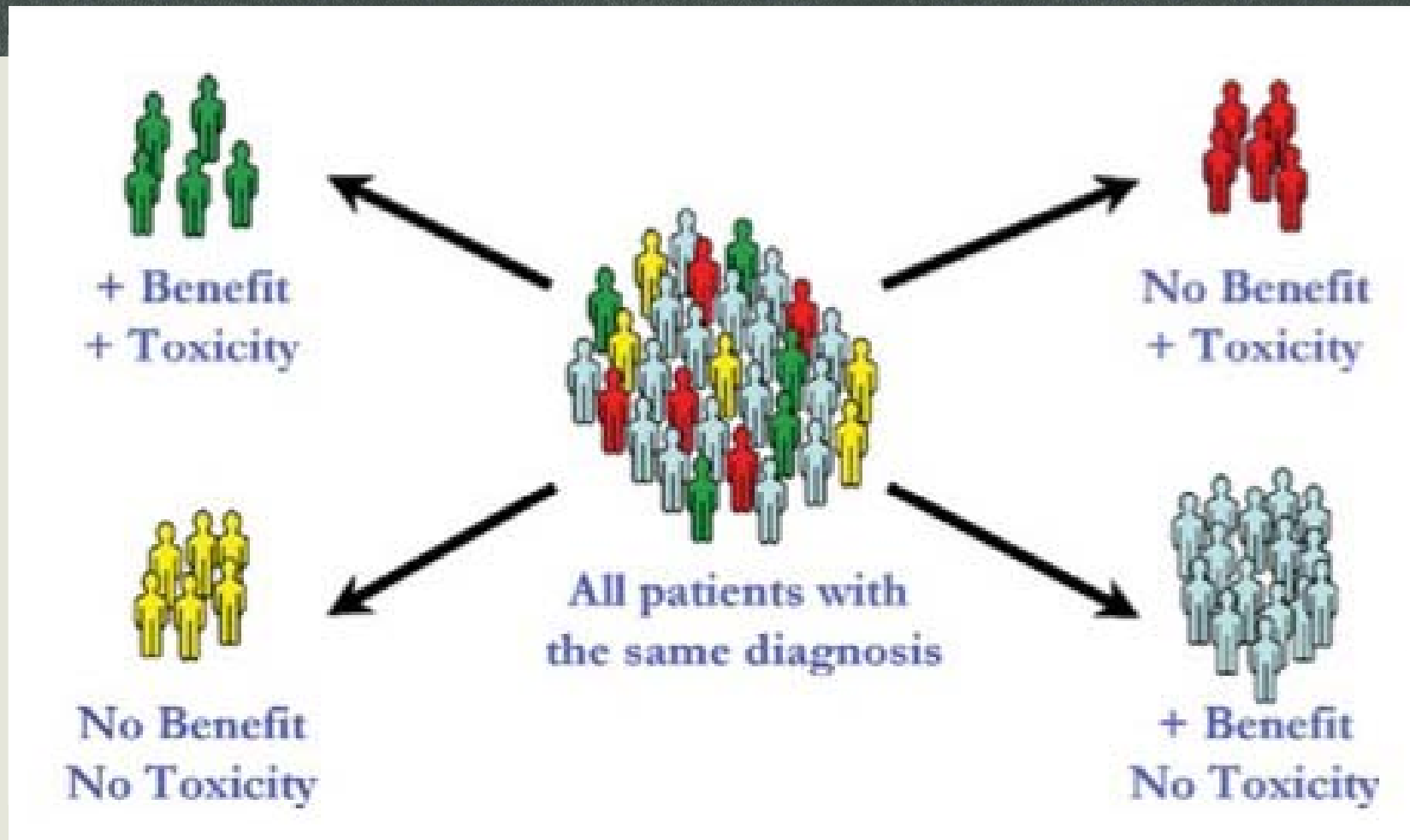
Entrepreneurship in Diagnostic, Pharmaceuticals and Healthcare



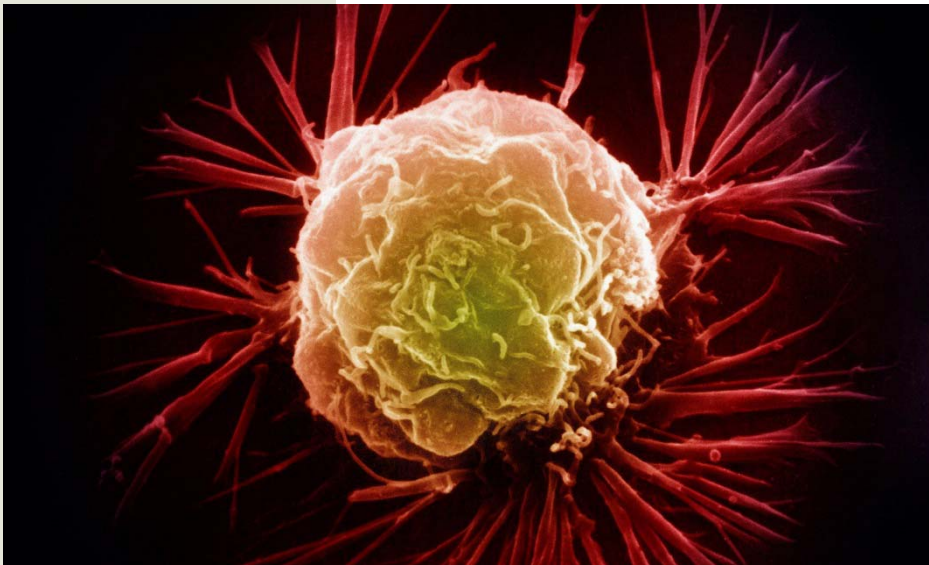
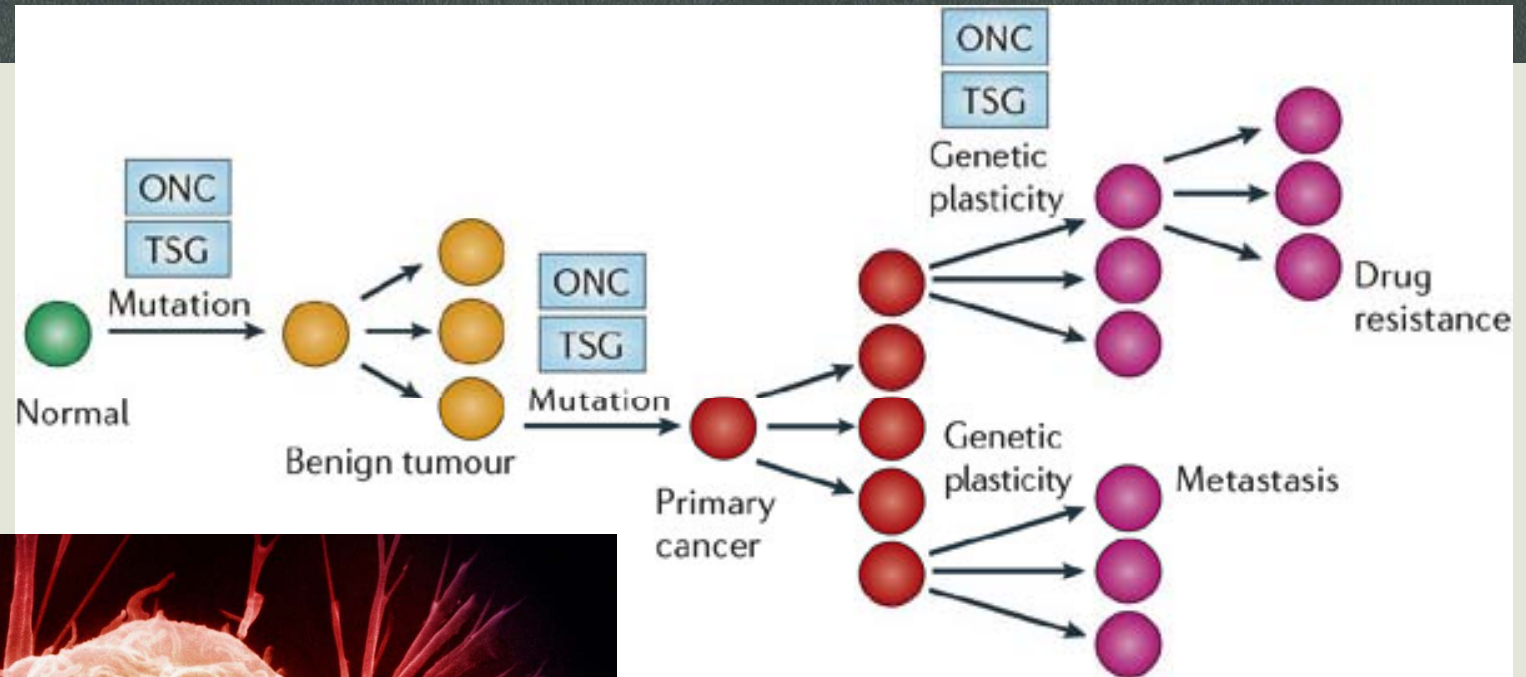
Manop Pithukpakorn, MD
Division of Medical Genetics
Department of Medicine



Conventional medical treatment



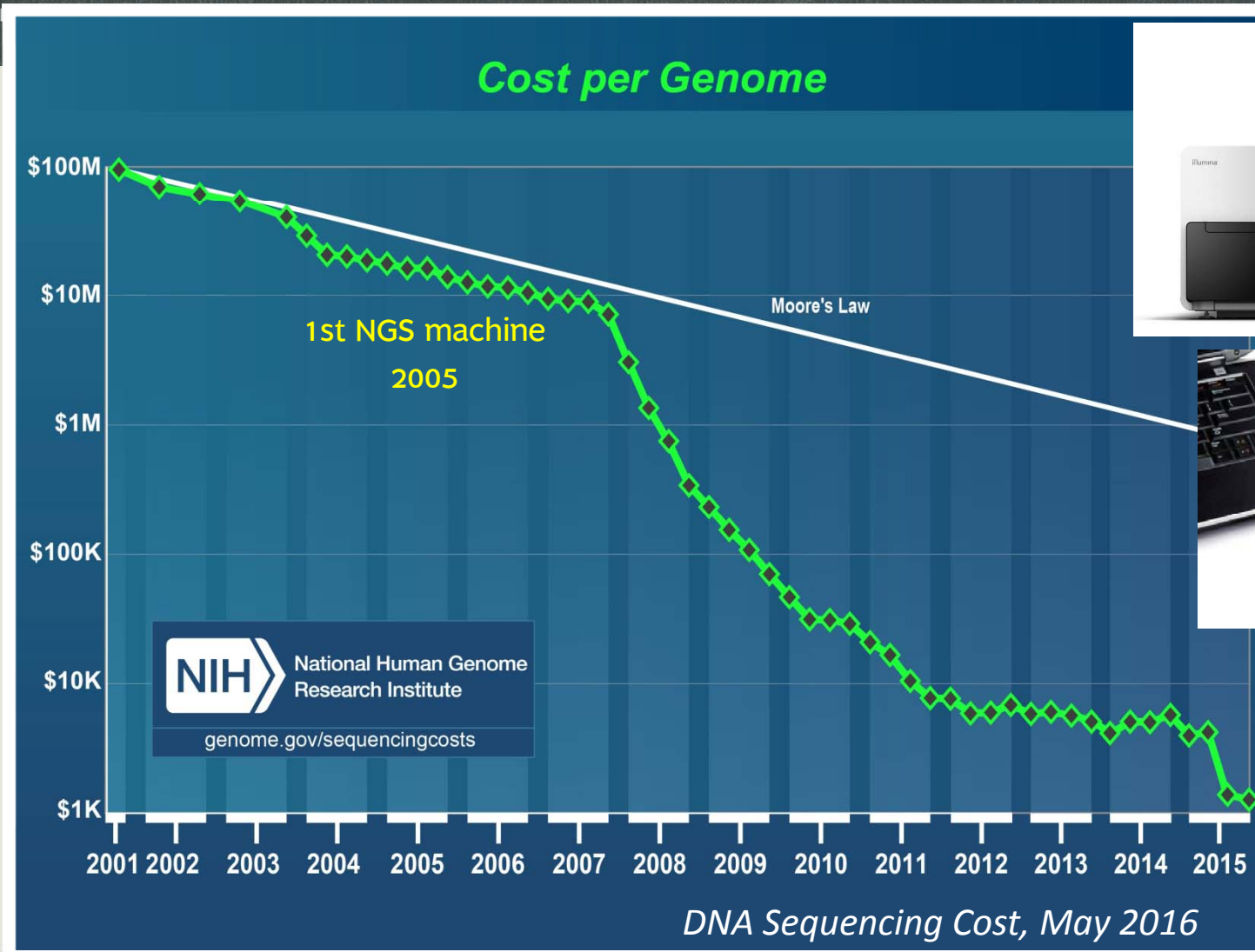
Cancer Precision Medicine



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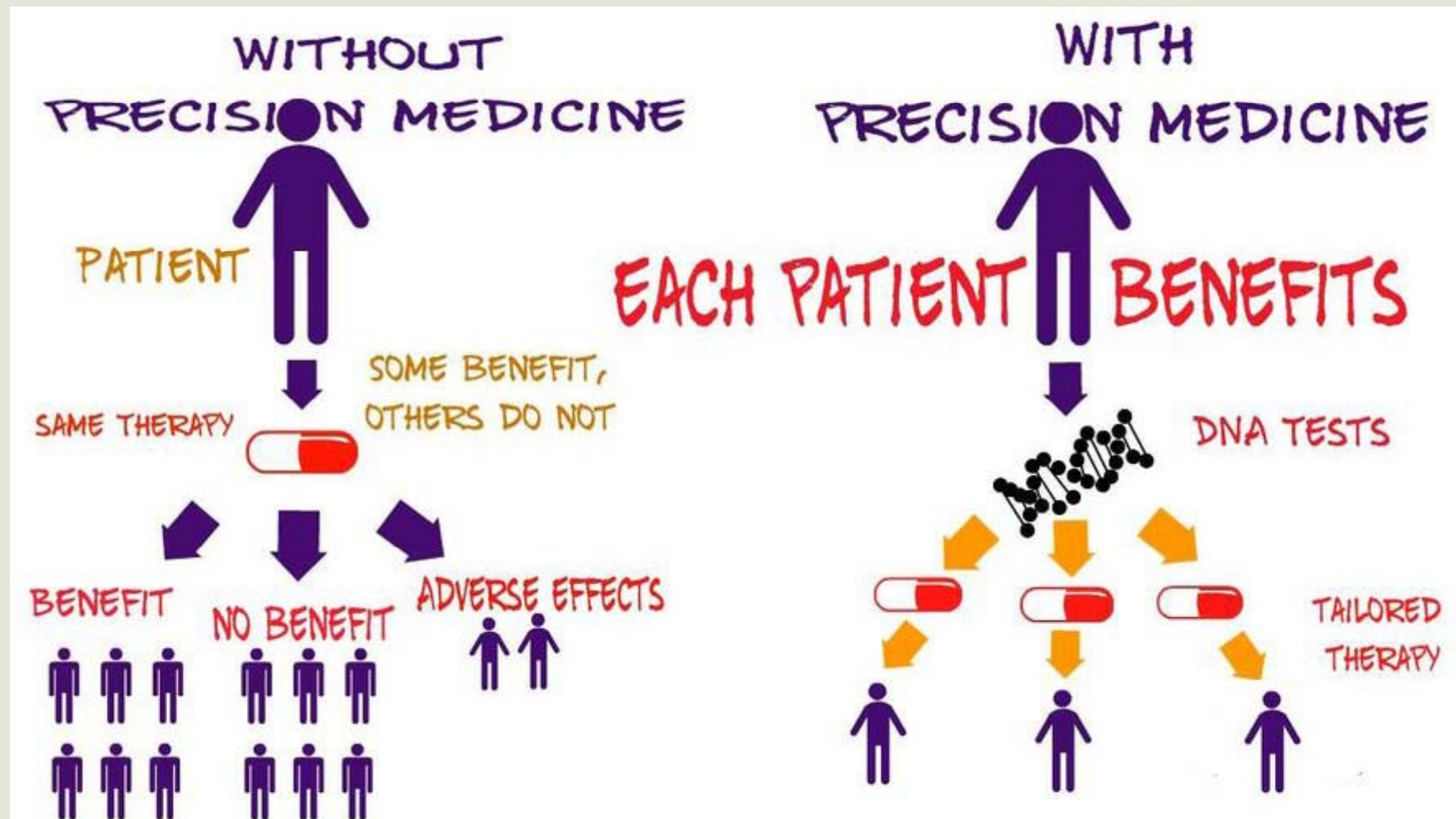
Feinberg AP, et al Nat Rev Genet 7, 21-33, 2006

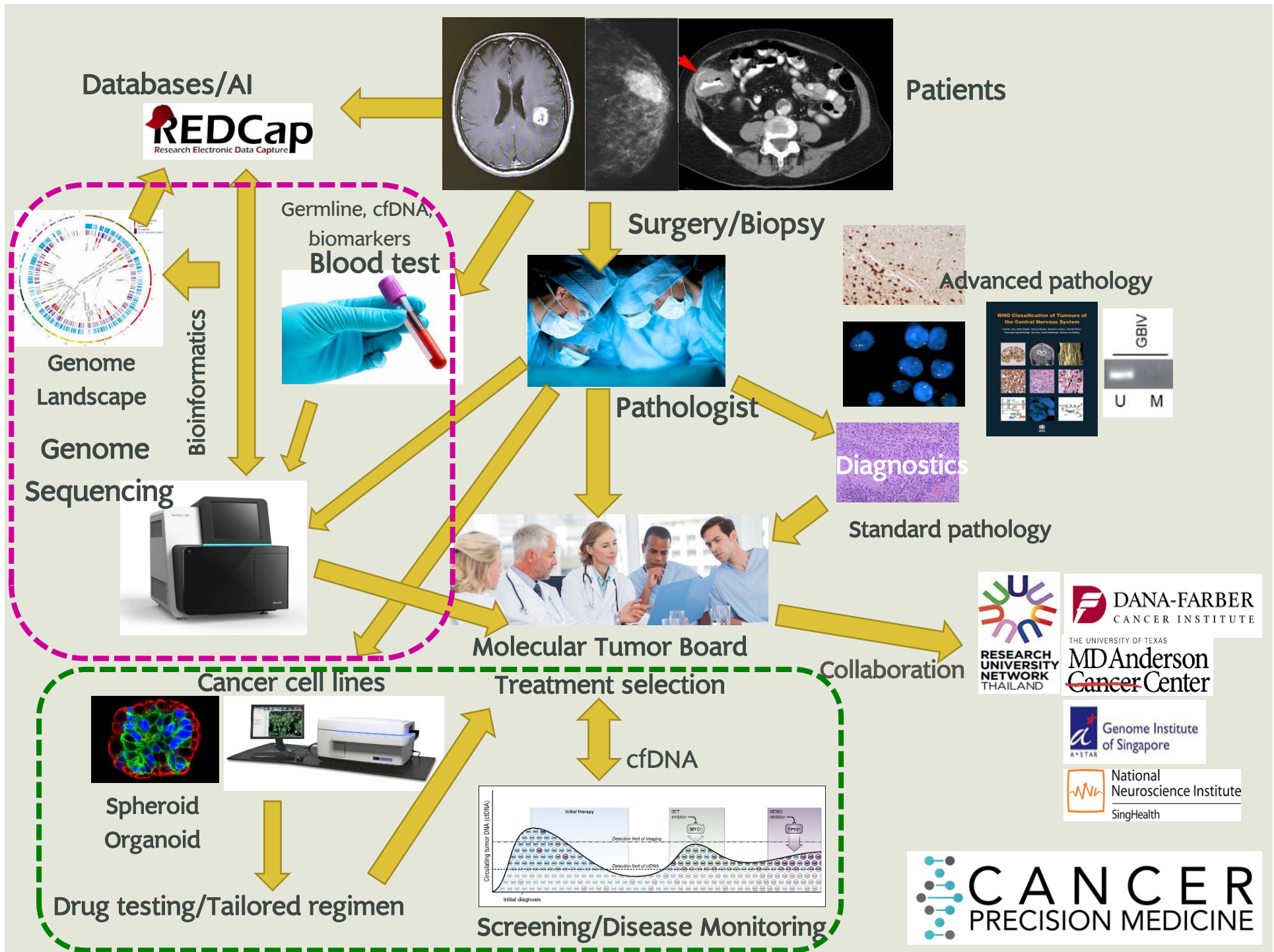
Affordability of Genome Sequencing



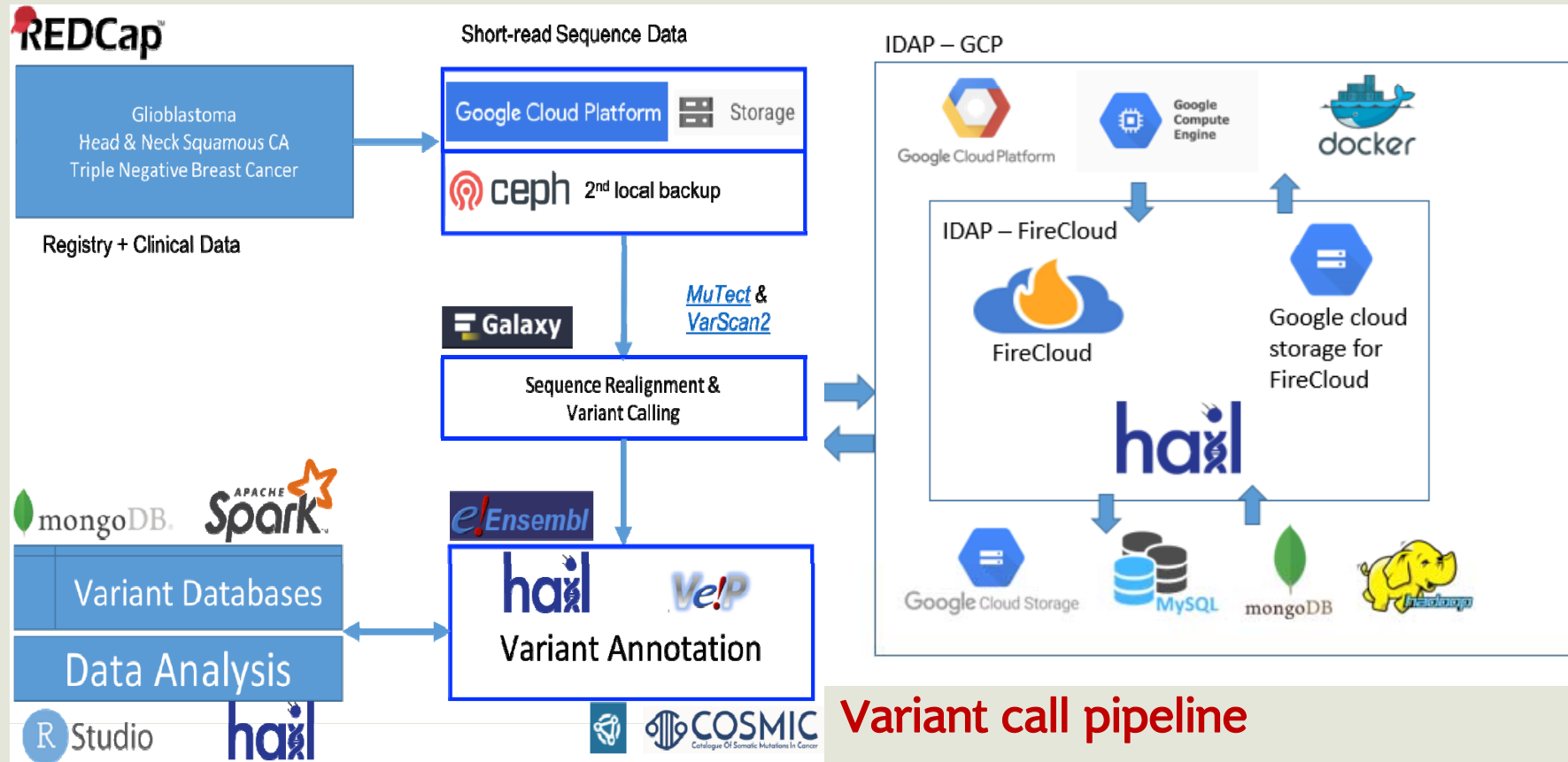
Diagnostic Area
Rare diseases
Cancer
Pharmacogenomics

Precision Medicine

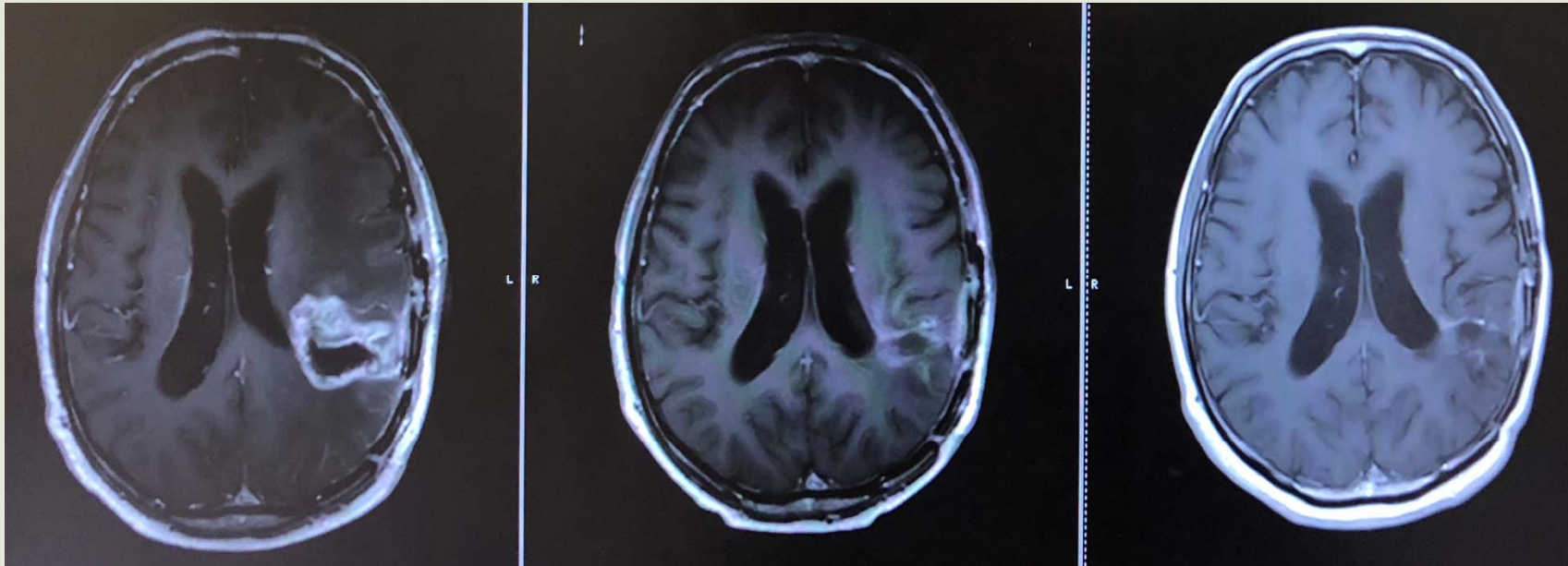




Bioinformatic Analysis



Tumor sequencing can guide treatment



Before treatment

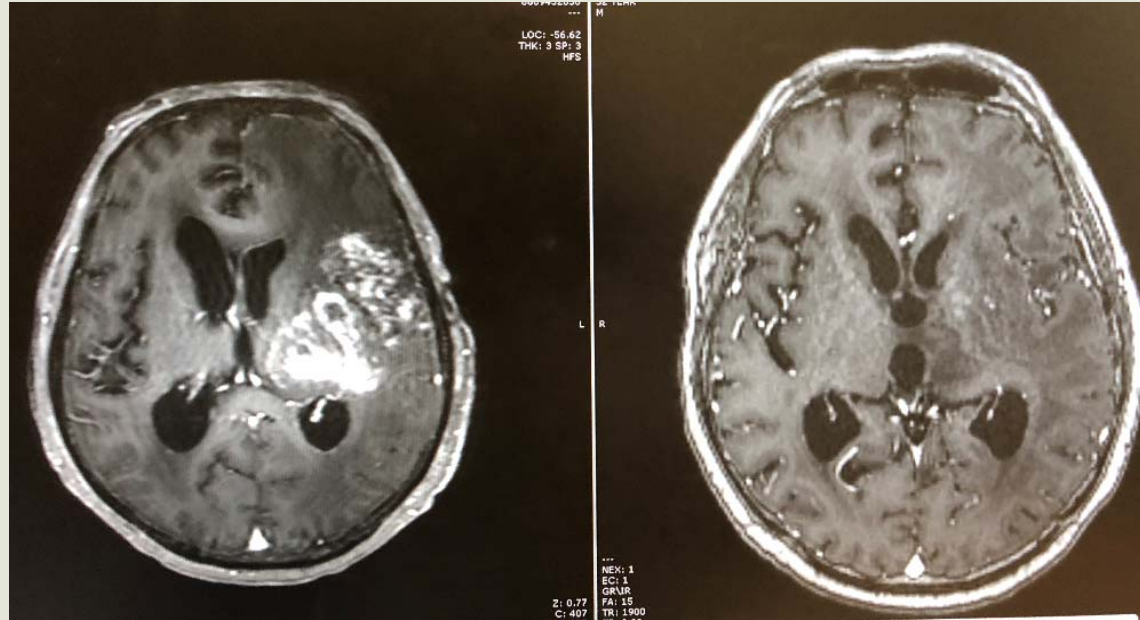
After 3 months of **Pembrolizumab**

After 10 months

- 65 years old male with recurrent brain cancer
- Failed radiation and standard chemotherapy
- Identified *specific mutations* that predict good response with treatment

Tumor sequencing can guide treatment

Before
treatment

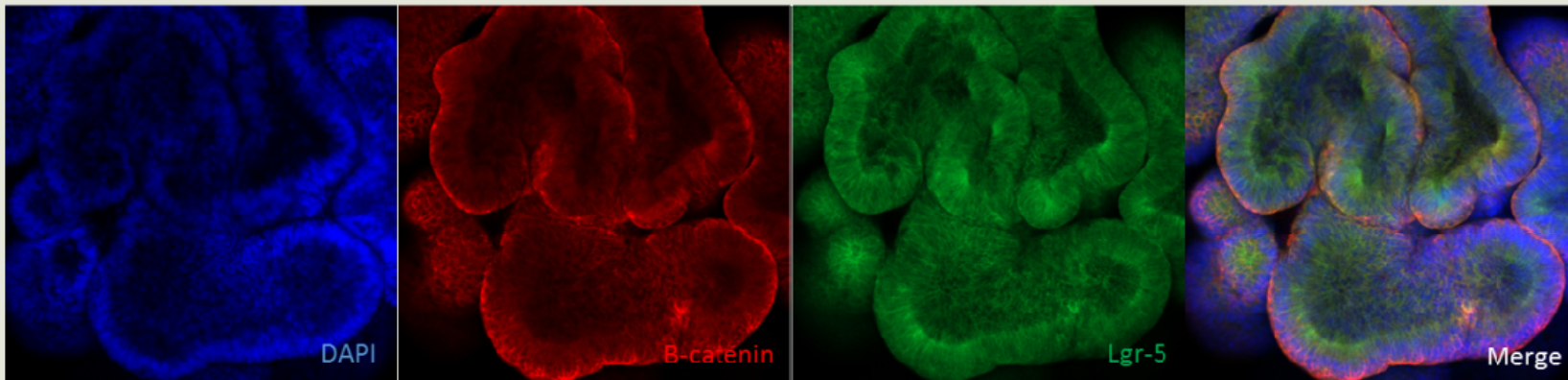
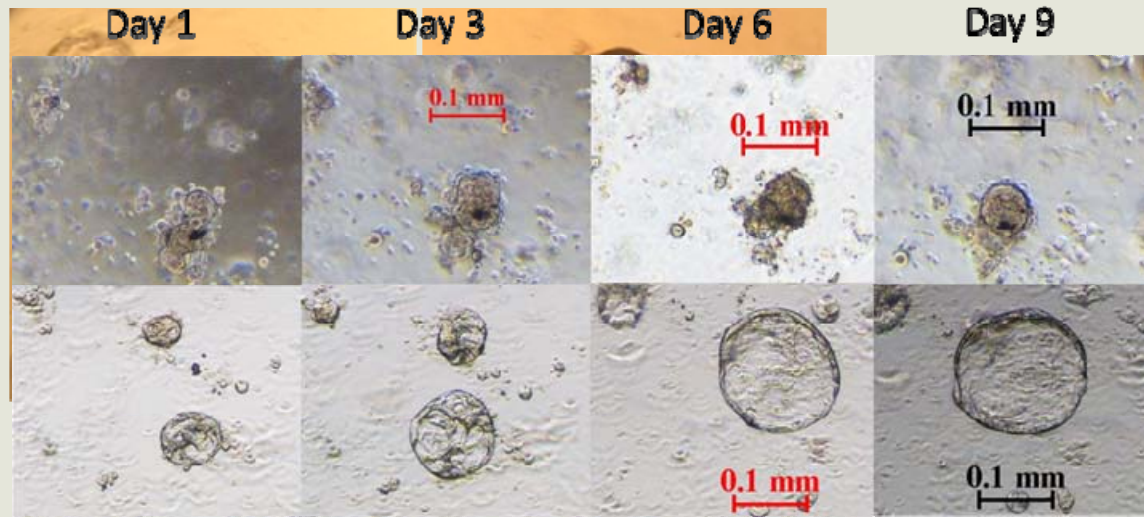


After
4 weeks of
Lenvatinib

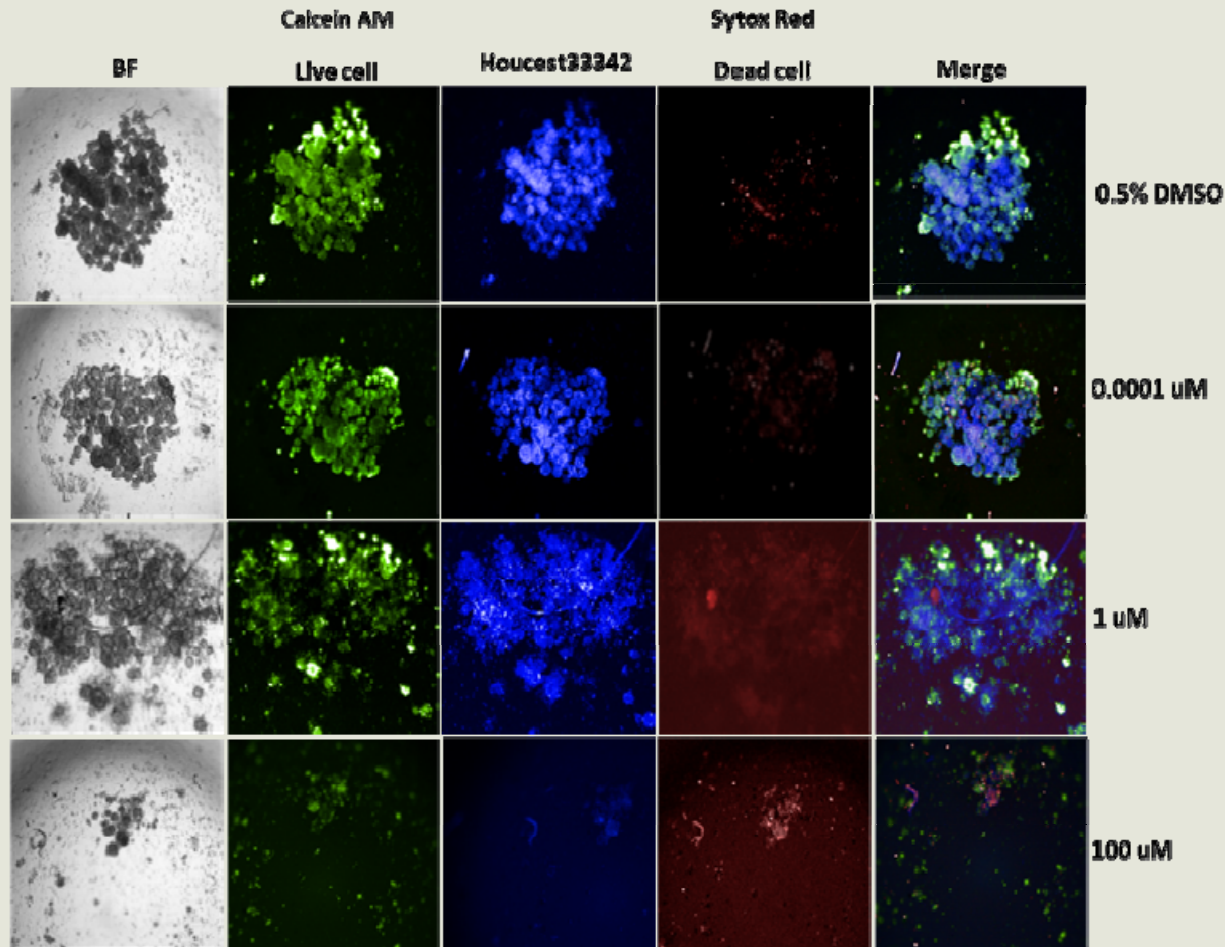
- 53 years old male with recurrent brain cancer
- Failed several drugs and immunotherapy
- Identified specific *FGFR3-TACC3* fusion

Cell line development and drug test

Colon & breast cancer organoid



Cell line development and drug test



Organoid from a patient with colon cancer

Dead cell by Sytox Red and Live cell by Calcein AM staining after Irenotecan exposure at different concentration

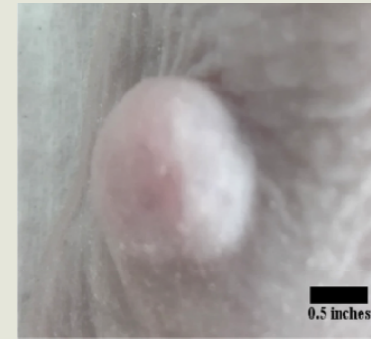
PDX – Cancer implants in mice



2 week



4 week



5 week



7 week



9 week



11 week

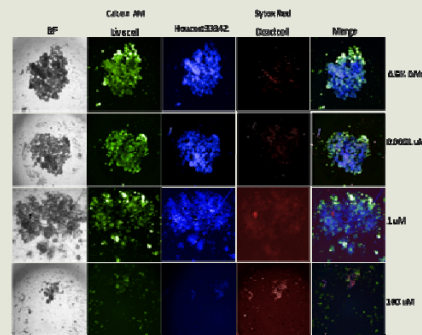
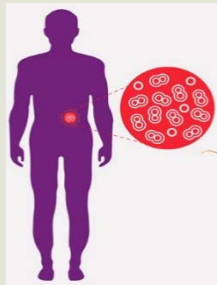
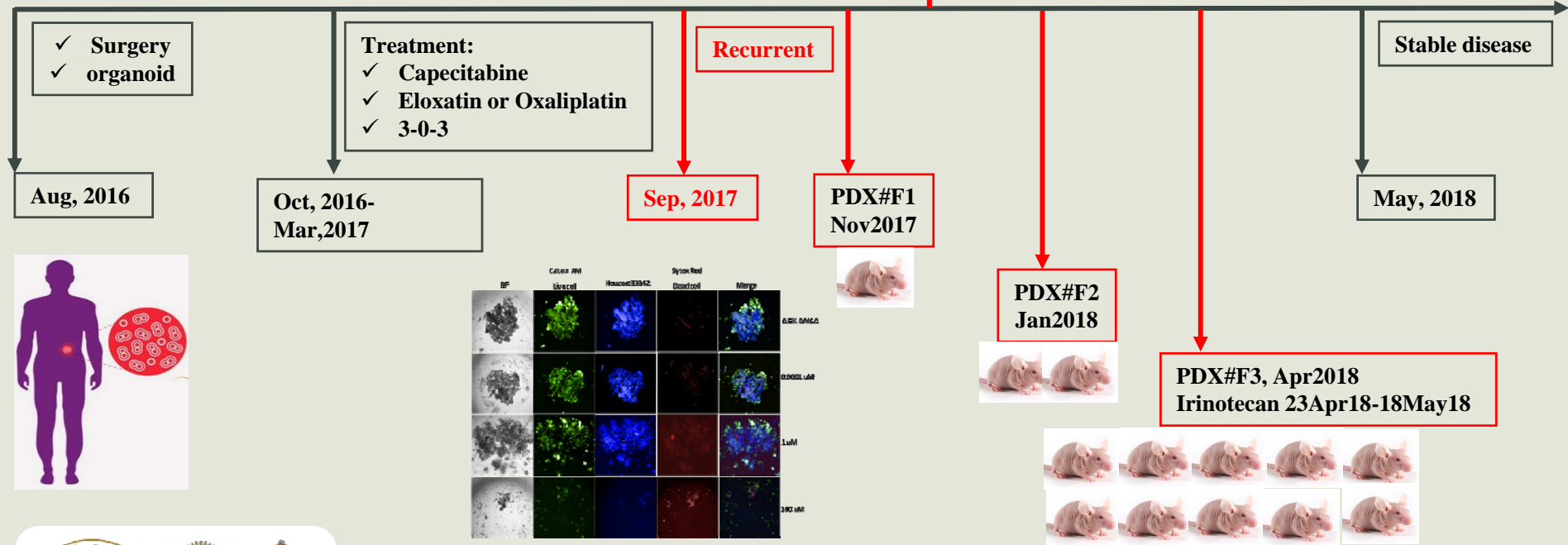
Drug testing parallel to treatment

CRC case 7: Male, 67 years old
 Primary Diagnosis: CA splenic flexure colon
 Morphology: Moderately-differentiated adenocarcinoma
 Tumor Stage: pT4aN2bMx

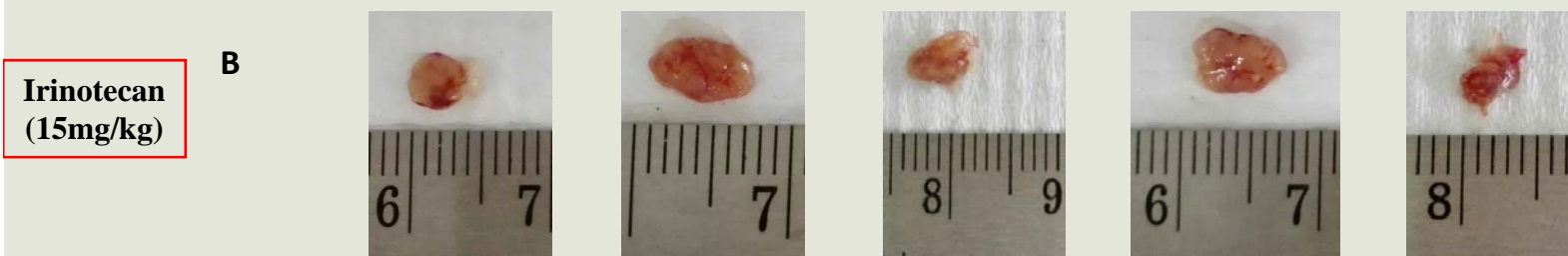
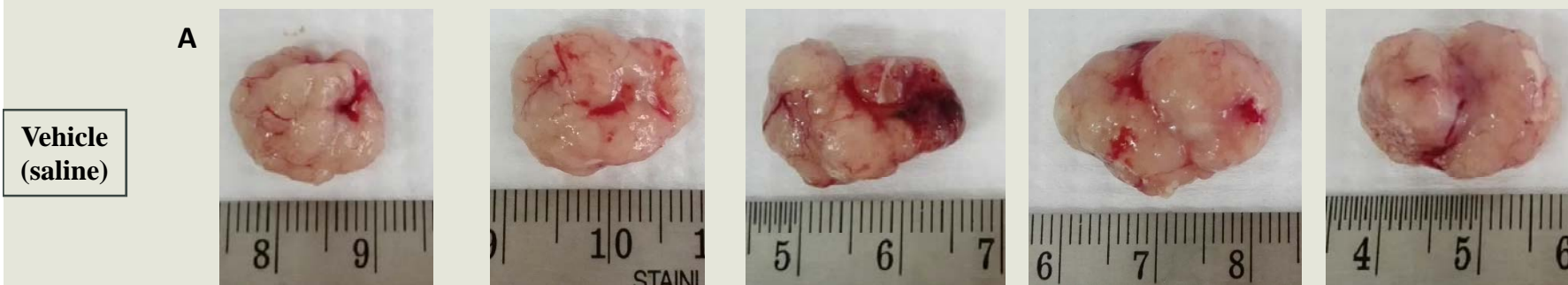
FOLFIRI+Avastin Regimen

- Fluorouracil
- Leucovorin
- Irinotecan
- Bevacizumab

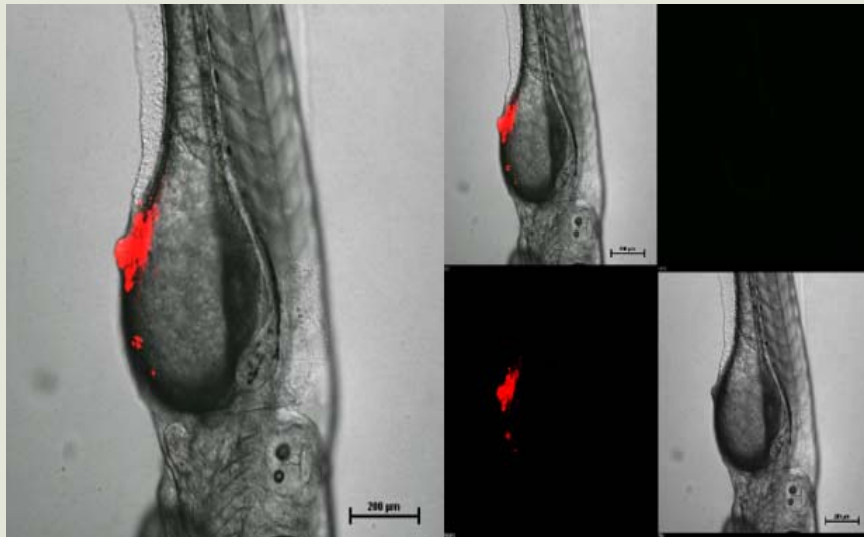
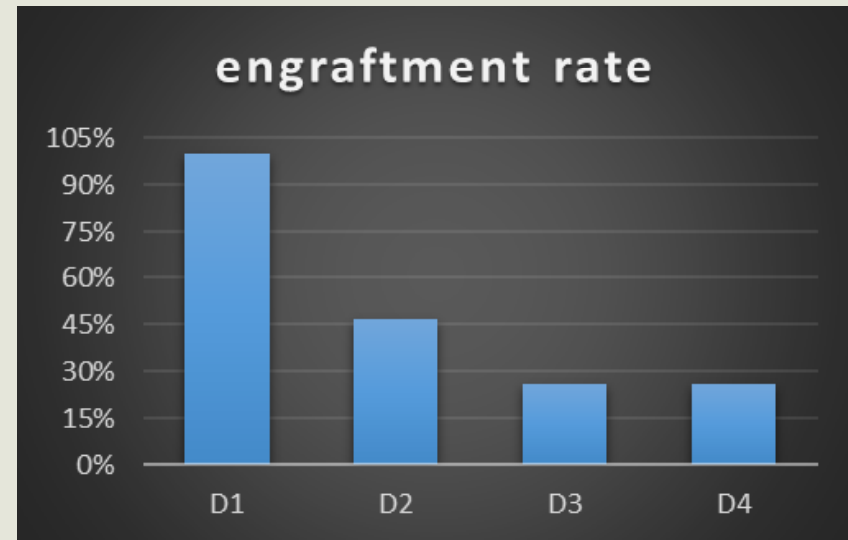
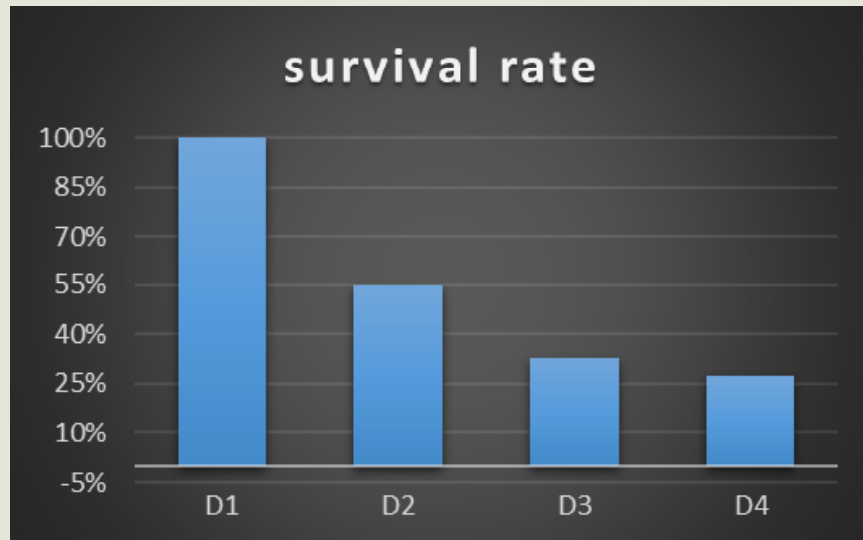
Timeline



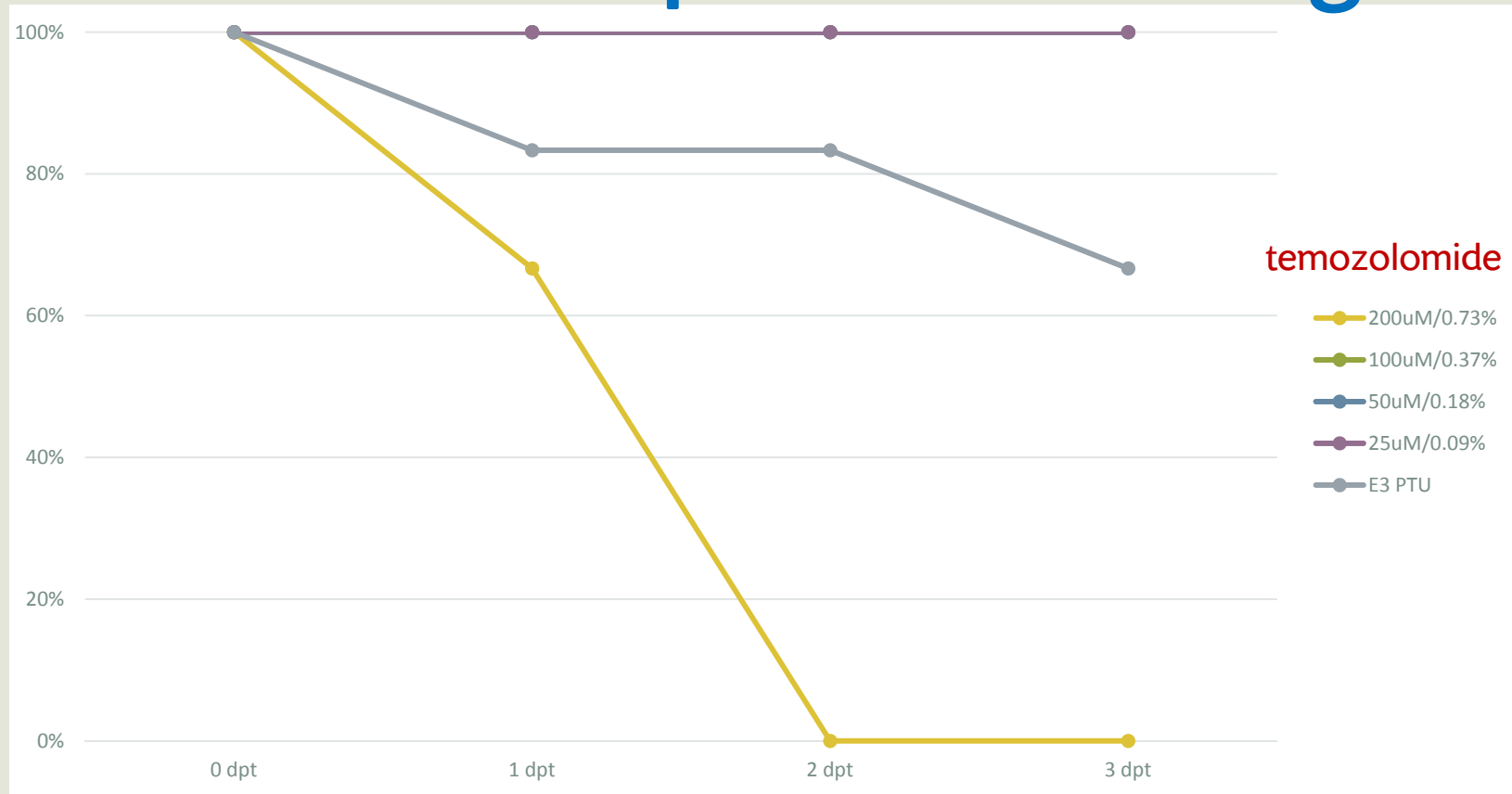
Drug testing parallel to treatment



Cell line development and drug test

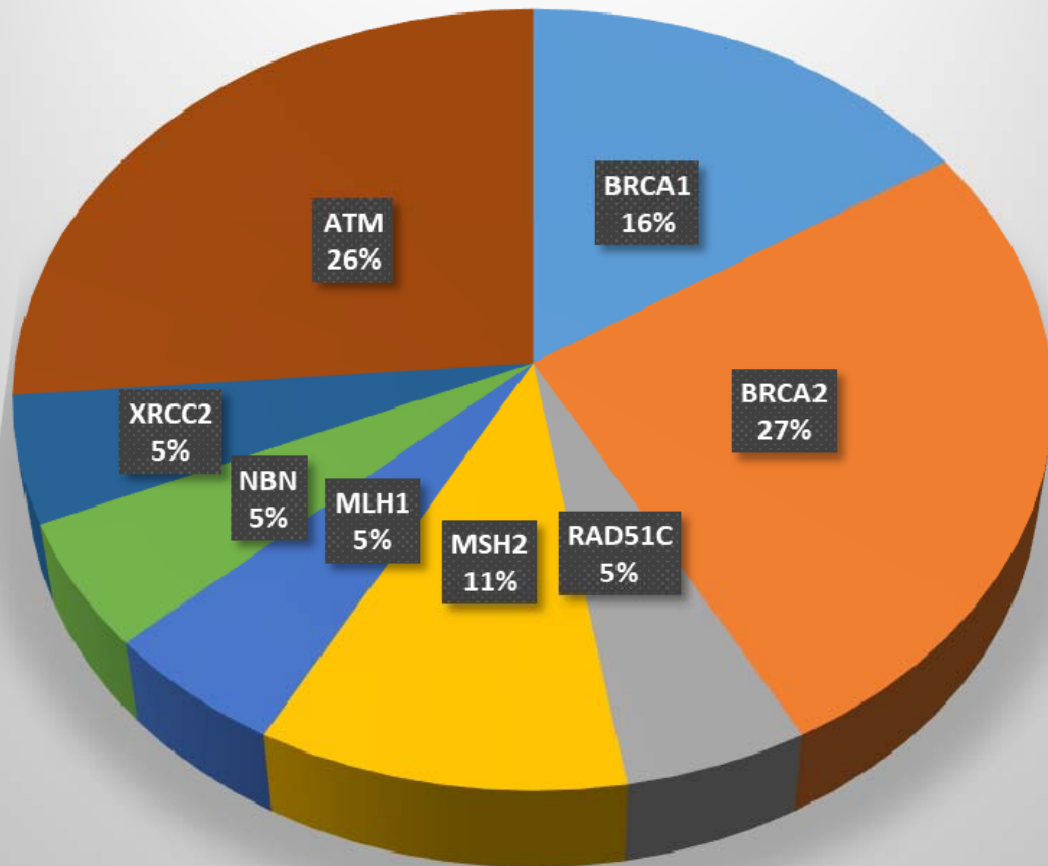


Cell line development and drug test



Multi-Gene Panel Test for Hereditary Cancer

Germline Mutations in Breast Cancer



Probands with clinical suspicion of hereditary breast cancer (NCCN guideline 2018)

29.2% identified pathogenic/likely pathogenic variants (PVS, PS)

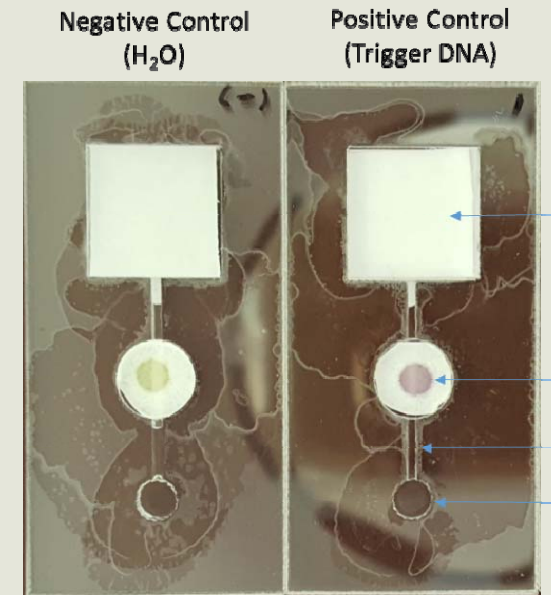
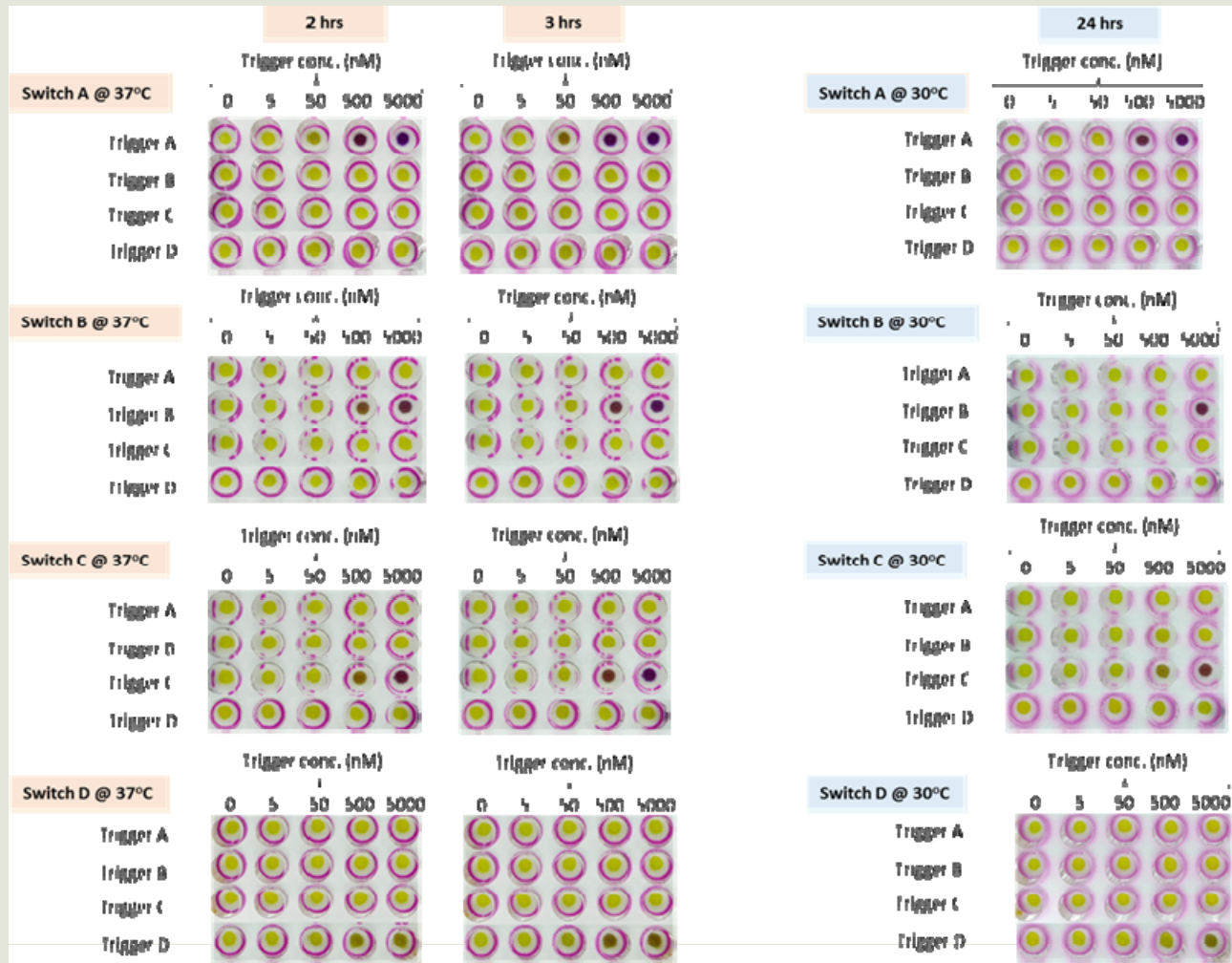
Nation-wide expansion could prevent/early detect breast cancer up to **5,000 cases/yr** and **save 220M/yr**



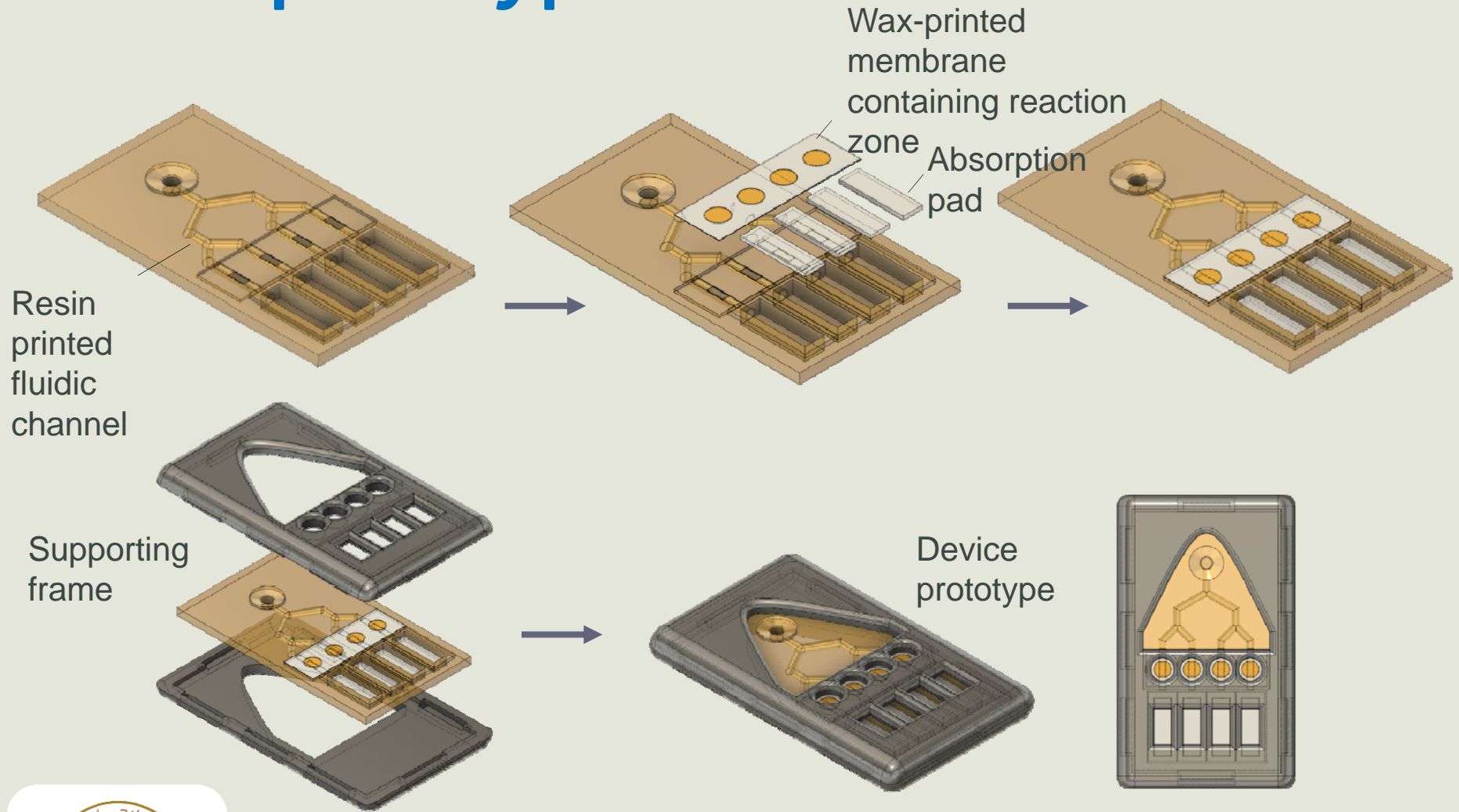
APC, ATM, AXIN2, BARD1, BMPR1A, BRCA1, BRCA2, BRIP1, CDH1, CDK4, CDKN2A, CHEK2, EPCAM, FANCC, MLH1, MSH2, MSH6, MUTYH, NBN, NTHL1, PALB2, PMS2, POLD1, POLE, PTEN, RAD51C, RAD51D, SMAD4, STK11, TP53, VHL, XRCC2



POCT Rapid Detection



New prototype





RESEARCH
UNIVERSITY
NETWORK
THAILAND



CANCER
PRECISION MEDICINE





**RESEARCH
UNIVERSITY
NETWORK
THAILAND**



CANCER
PRECISION MEDICINE

