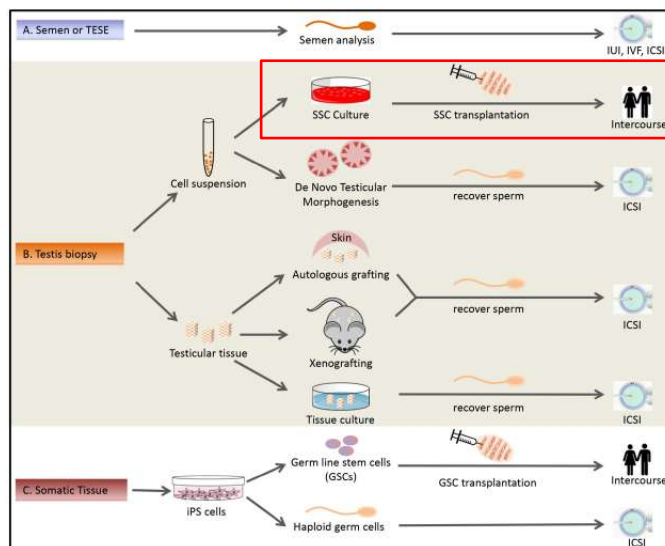




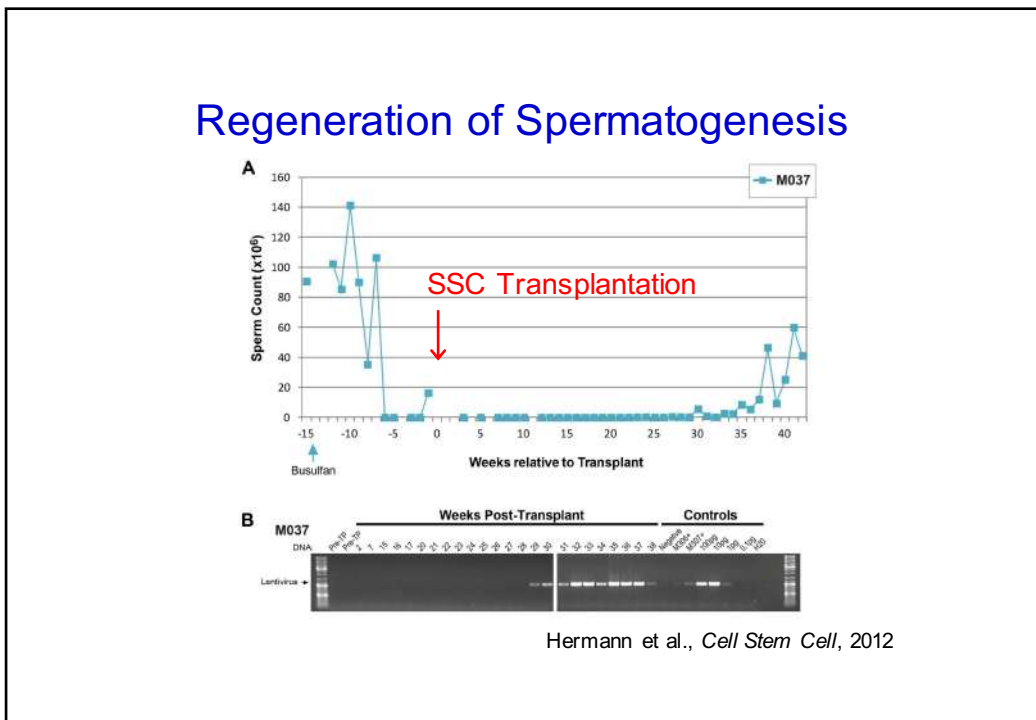
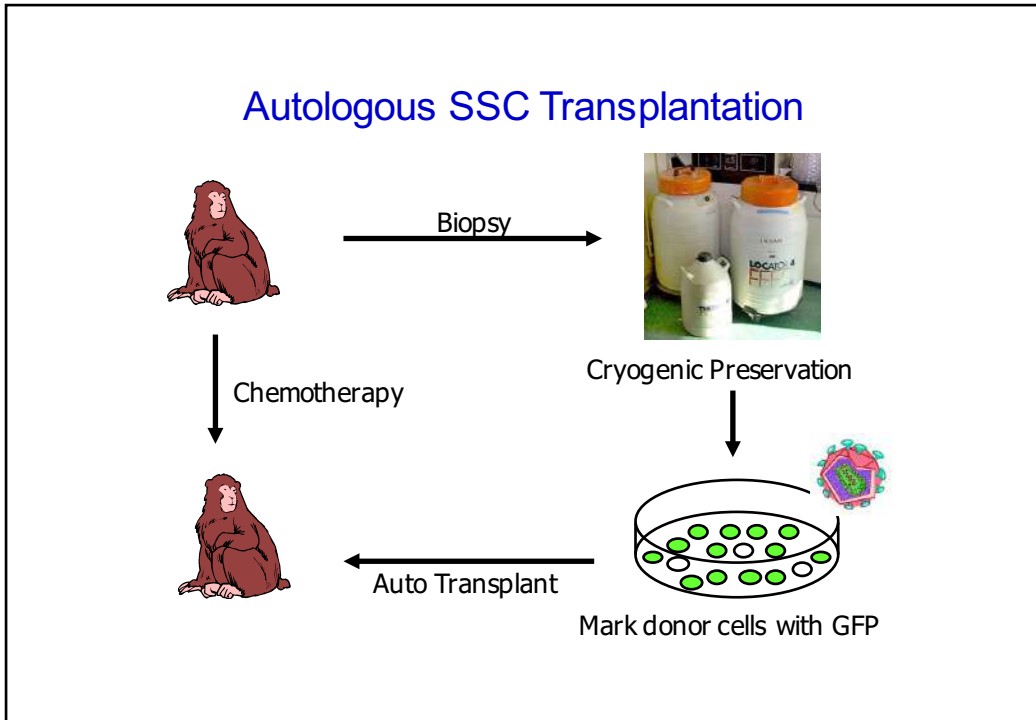
Gerald Schatten, USA

# How Can Gametes Retain their Genetic Integrity after Cancer Therapies?

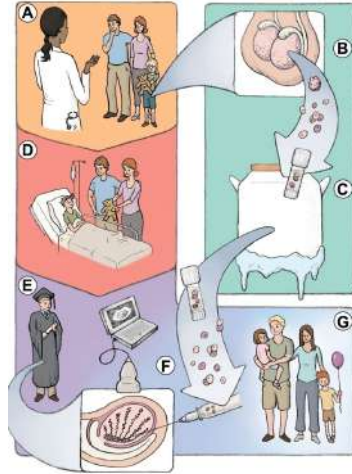
Nothing to Declare: Research and Mentoring Activities Sponsored by NIH



Gassei and Owig *Fertil Steril* 2016



## Fertility Preservation Program in Pittsburgh- Kyle Orwig (<http://www.fertilitypreservationpittsburgh.org>)

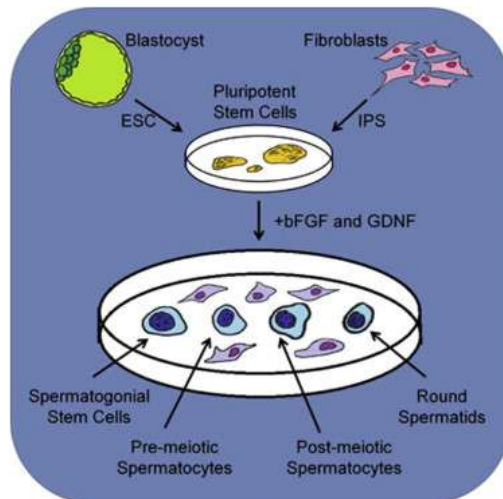


### Cryopreserved since 2011

- Testicular tissue: 110 boys
- Ovarian tissue: 25 girls
- Recruiting at 8 satellite sites in the US and abroad

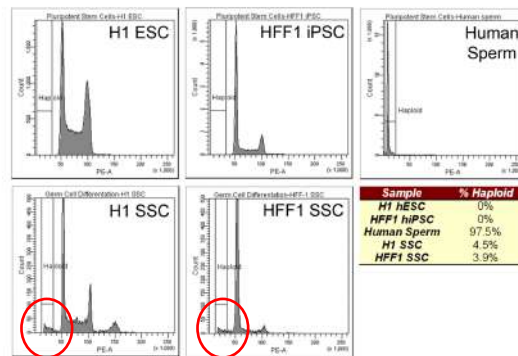
### Our Mission

- Educate Patients and Physicians
- Provide fertility preservation options
- Pioneer new technologies and translate them to the clinic
- Train the next generation of FP experts

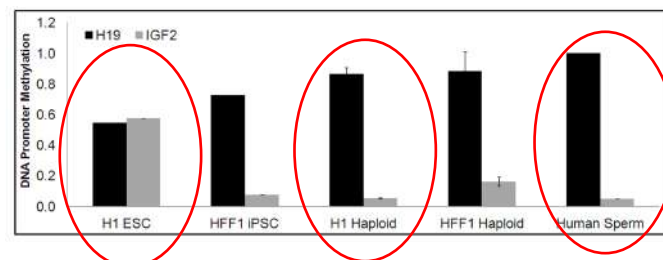


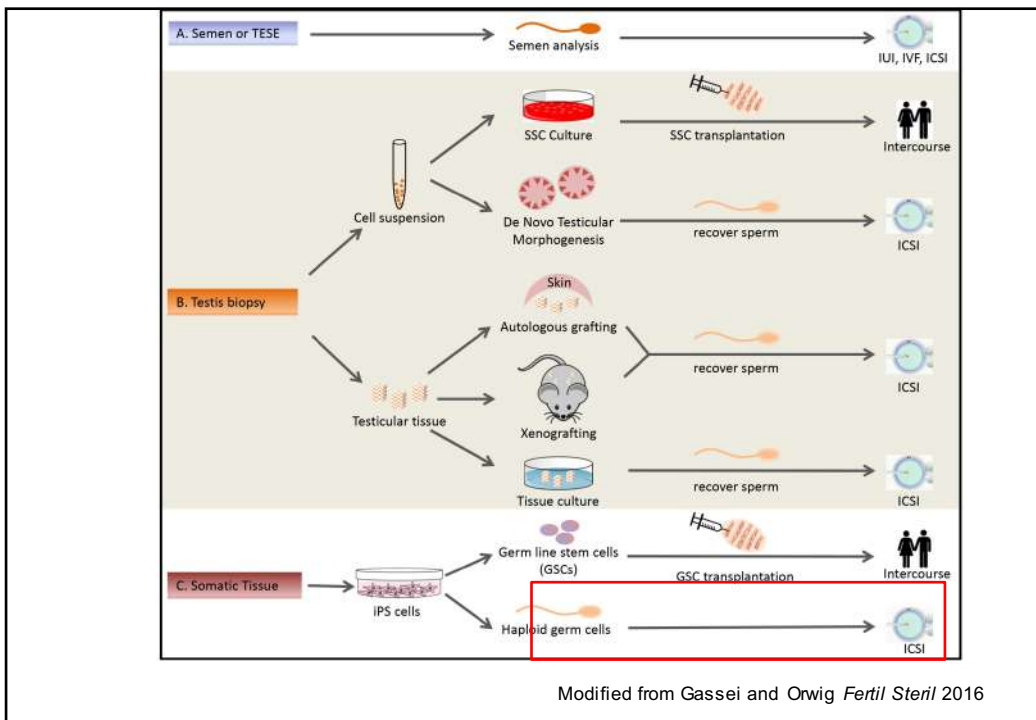
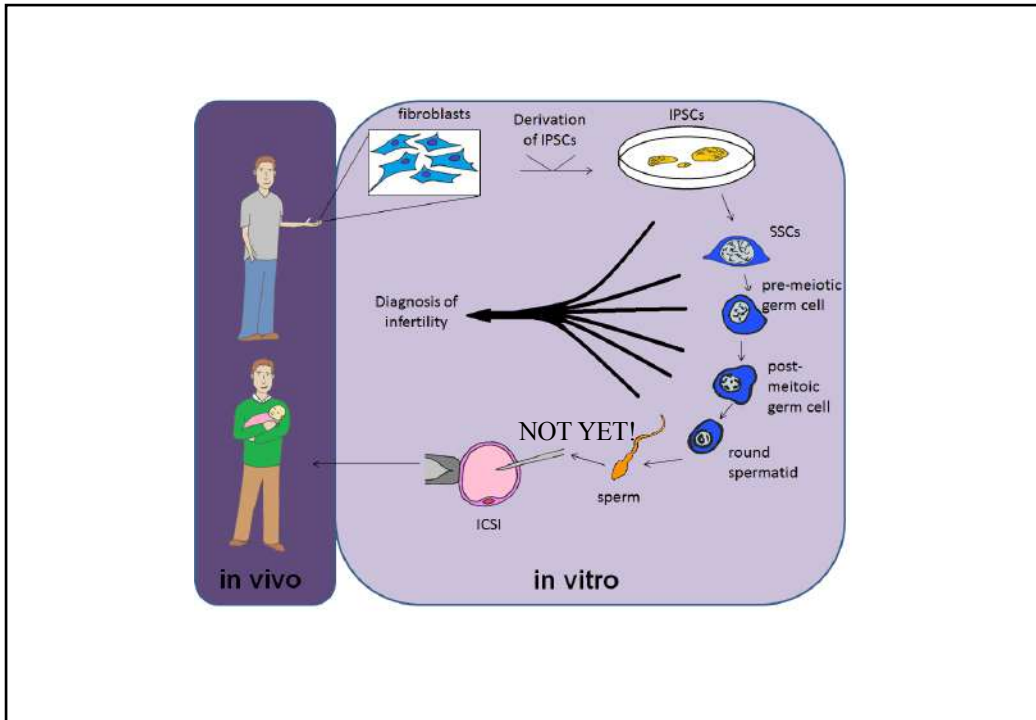
Direct Differentiation of Human Pluripotent Stem Cells into Haploid Spermatogenic Cells  
Cell Reports 2, 440-446, September 27, 2012. Chas Easley, B Phillips, M McGuire, J Barringer,  
H Valli, B Hermann, Cal Simerly, Alek Rajkovic, Toshio Miki, Kyle Orwig, Gerald P. Schatten

## Haploid Cells are Generated from hPSCs Cultured in SSC Conditions

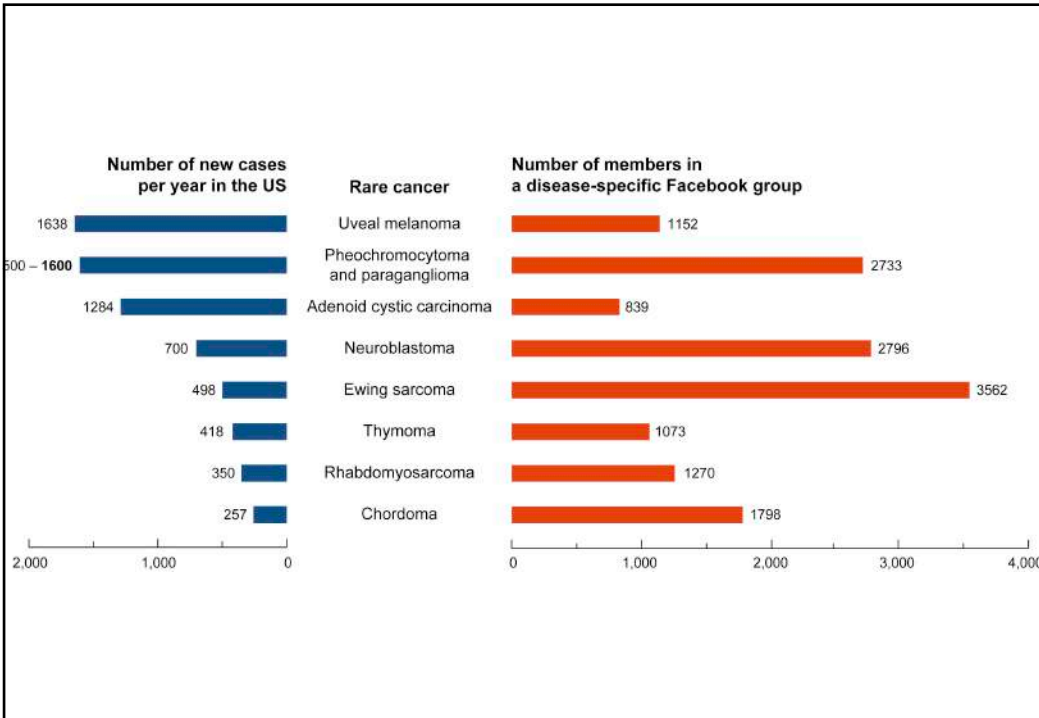


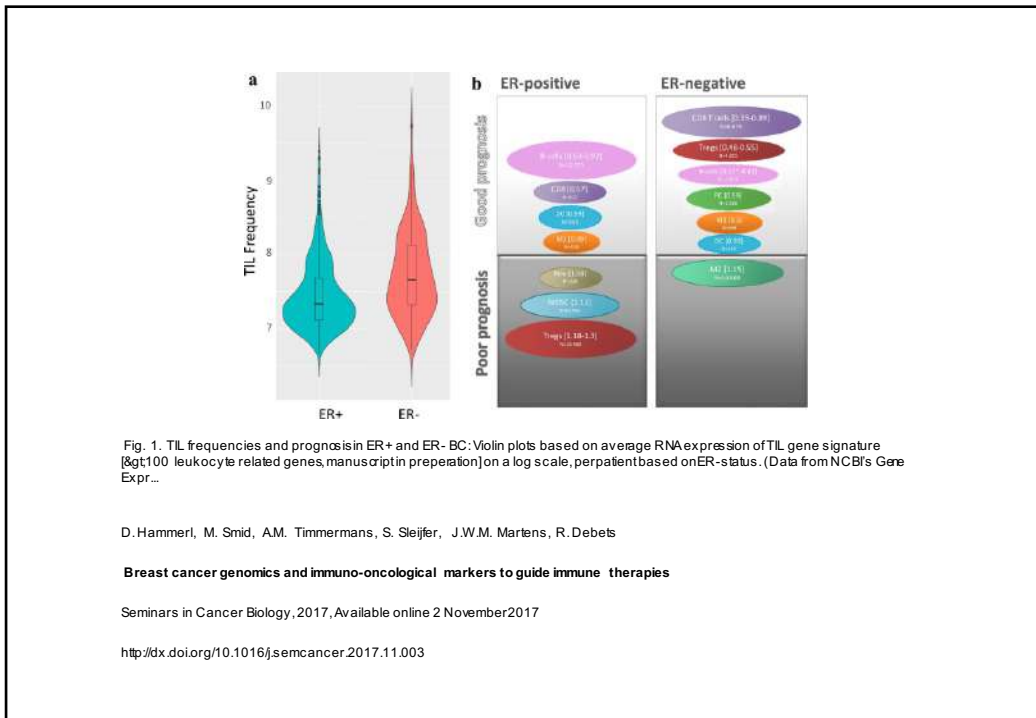
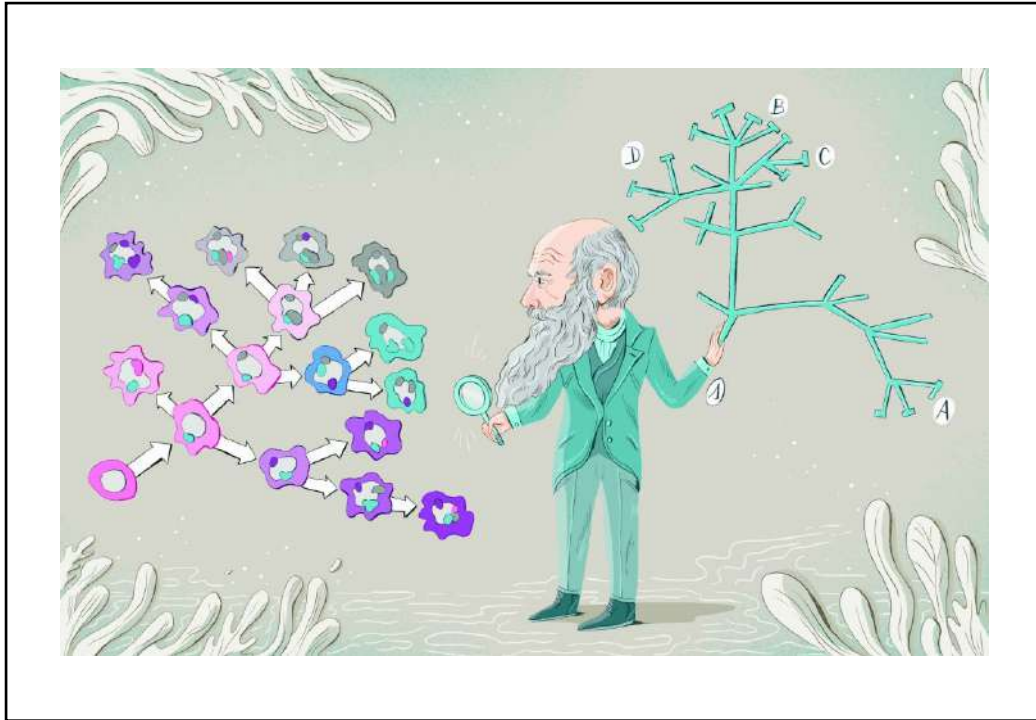
## Haploid Spermatids from Pluripotent Stem Cells Show Similar Imprint Patterns to Human Sperm





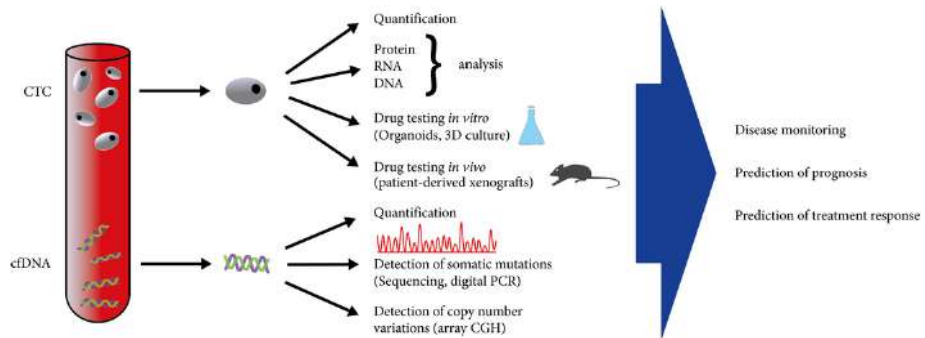
Modified from Gassei and Orwig *Fertil Steril* 2016





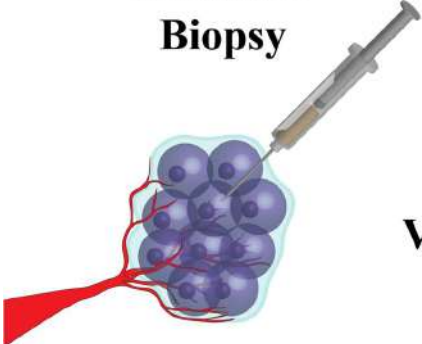
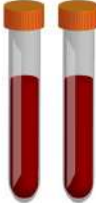


Liquid biopsy: ready to guide therapy in advanced prostate cancer?

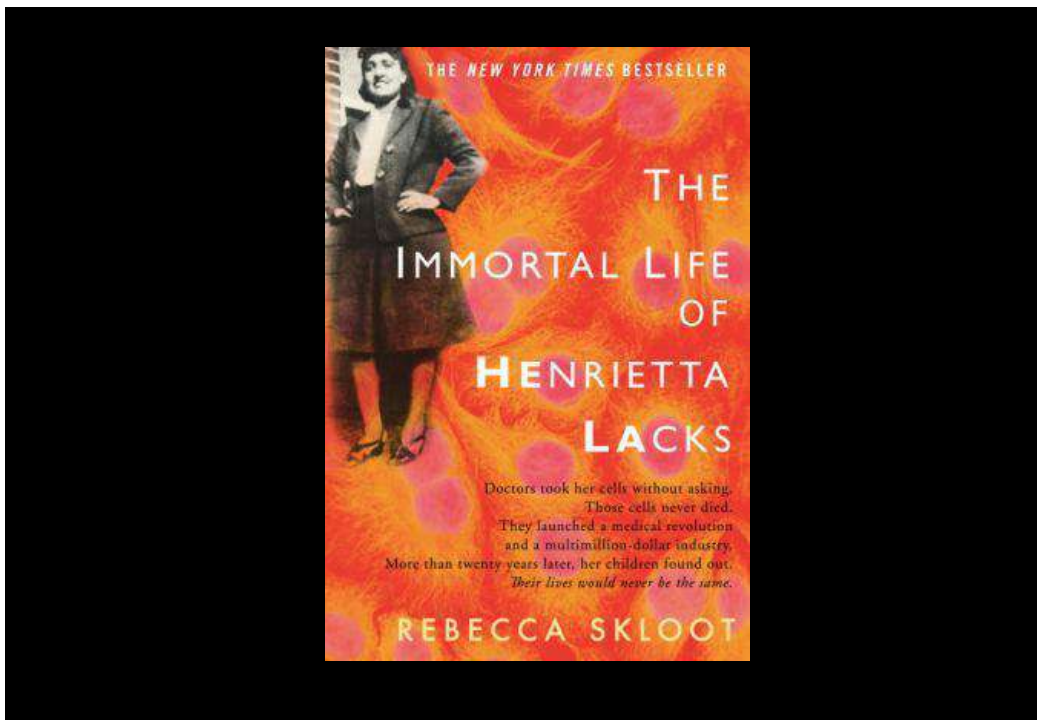
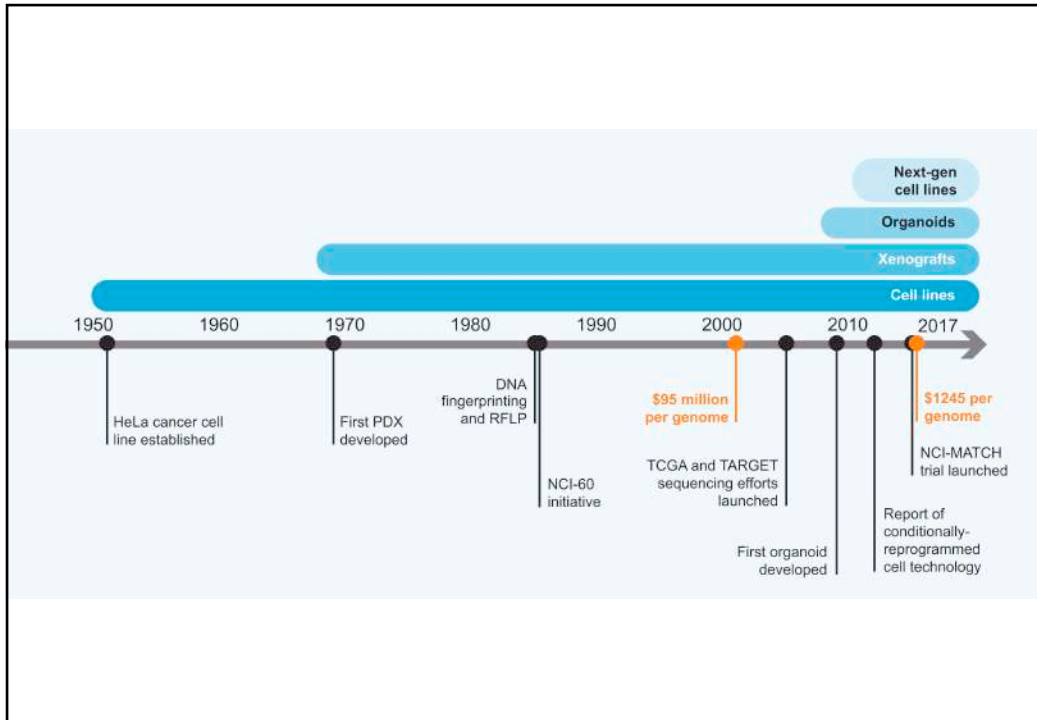


BJU International  
Volume 118, Issue 6, pages 855-863, 19 AUG 2016 DOI: 10.1111/bju.13586  
<http://onlinelibrary.wiley.com/doi/10.1111/bju.13586/full#bjui3586-fig-001>



<b>Standard Biopsy</b>	<b>VS.</b>	<b>Liquid Biopsy</b>
		
Time-Intensive Procedure Localized Sampling of Tissue Not Easily Obtained Some Pain/Risk Invasive		Quick Comprehensive Tissue Profile Easily Obtained Minimal Pain/Risk Minimally Invasive



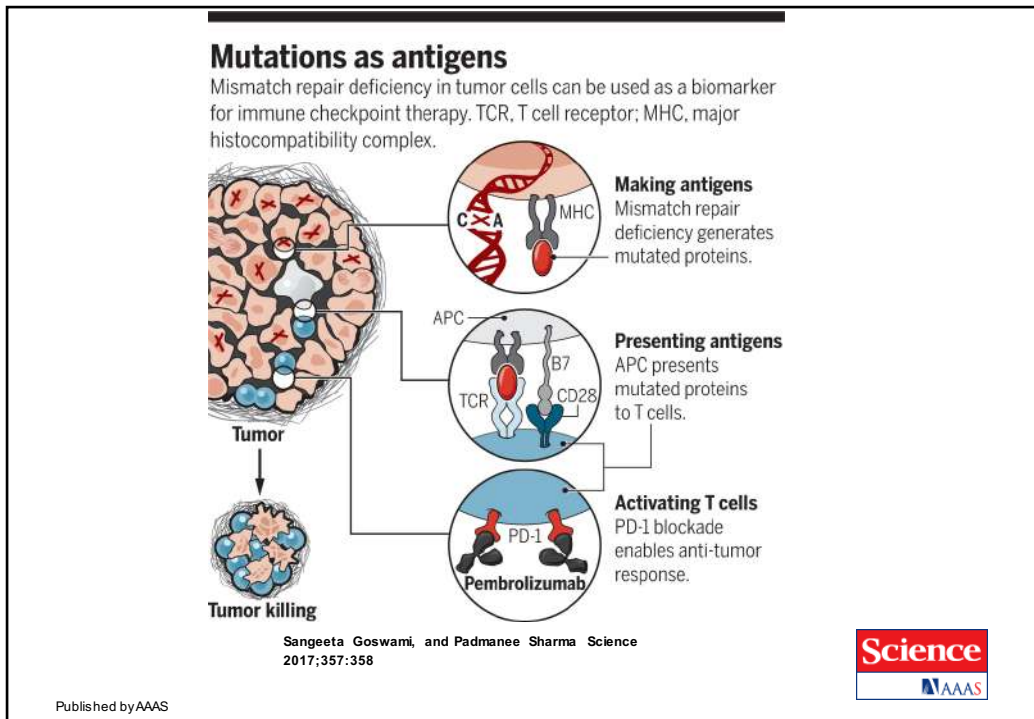




## New immunotherapy drug behind Jimmy Carter's cancer cure

Former president given pembrolizumab, one of the most promising new drugs in the treatment of cancer

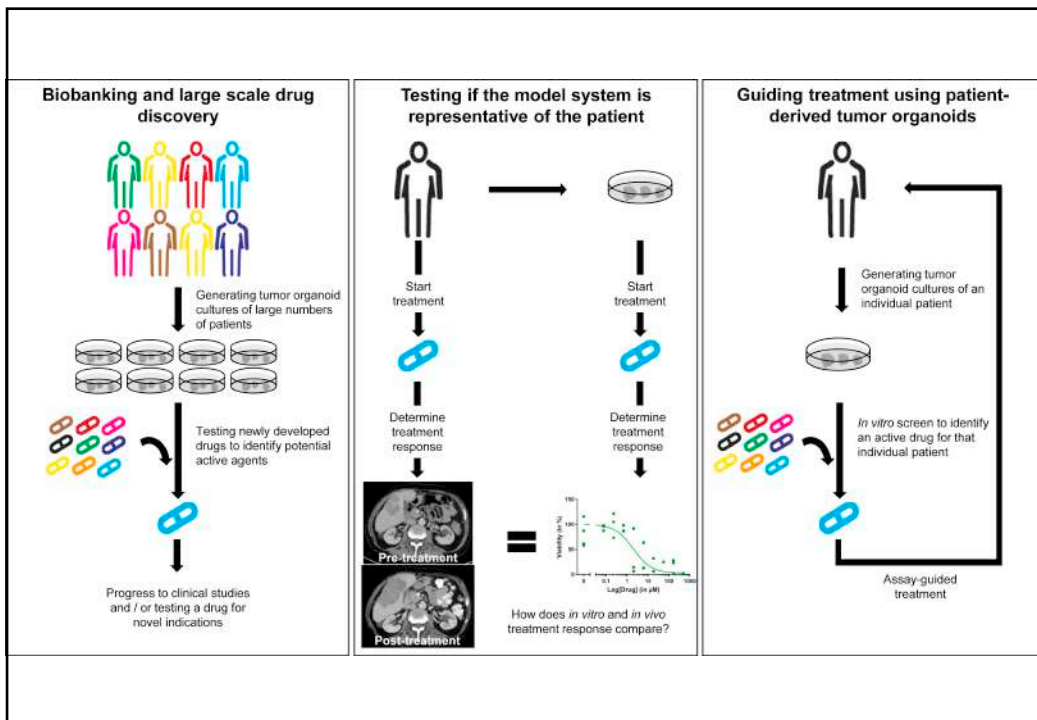
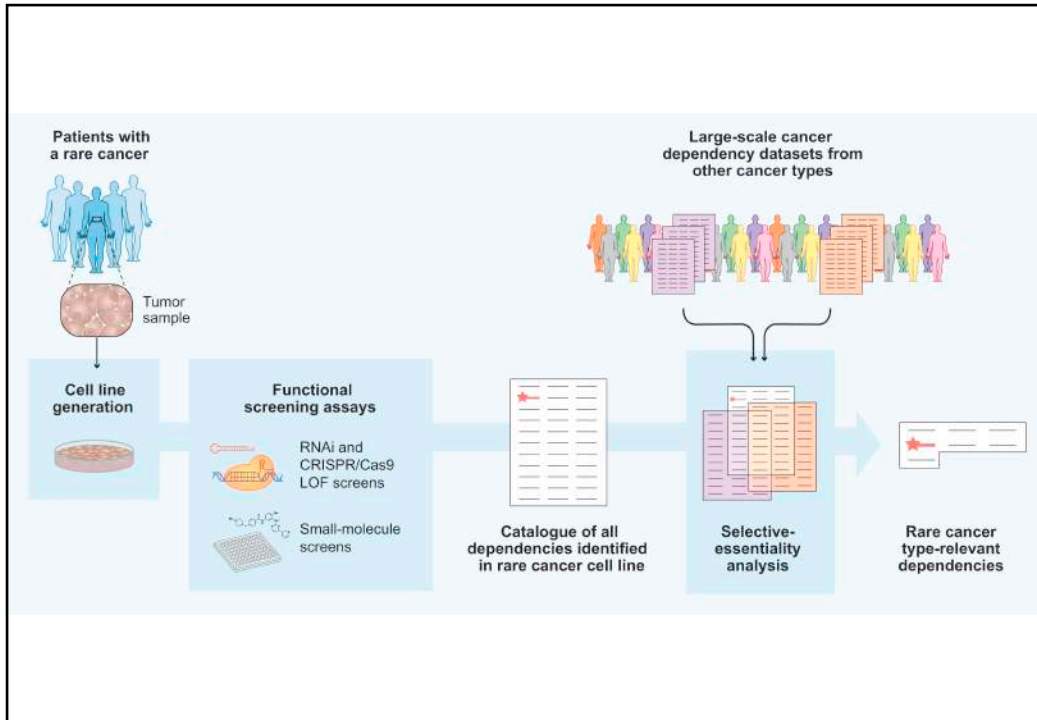


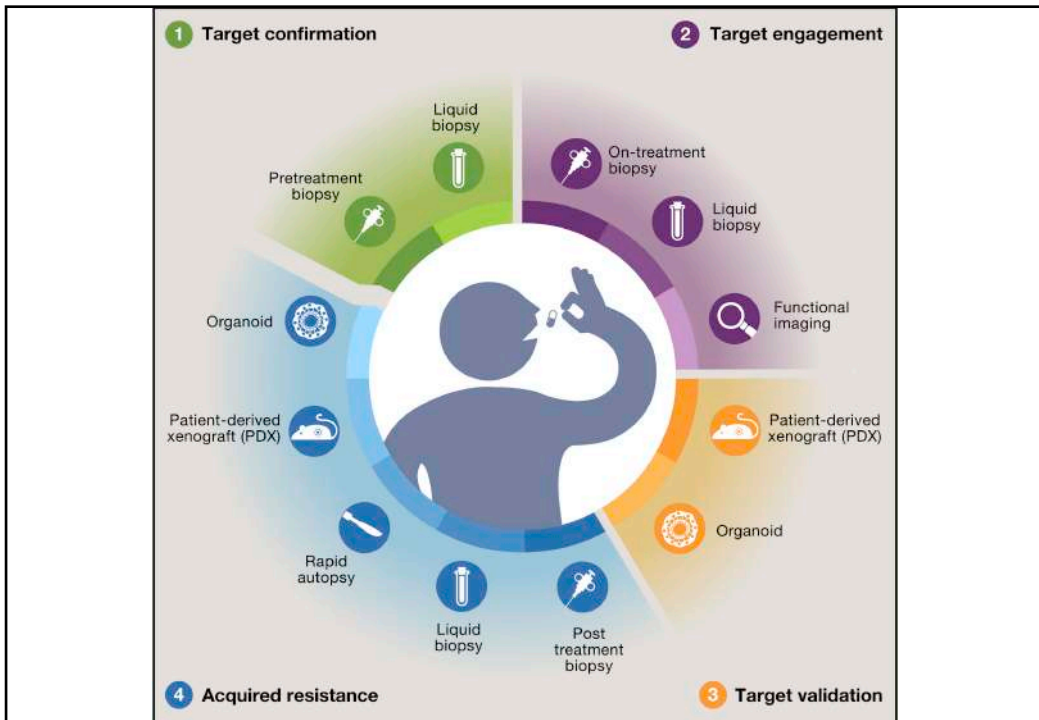
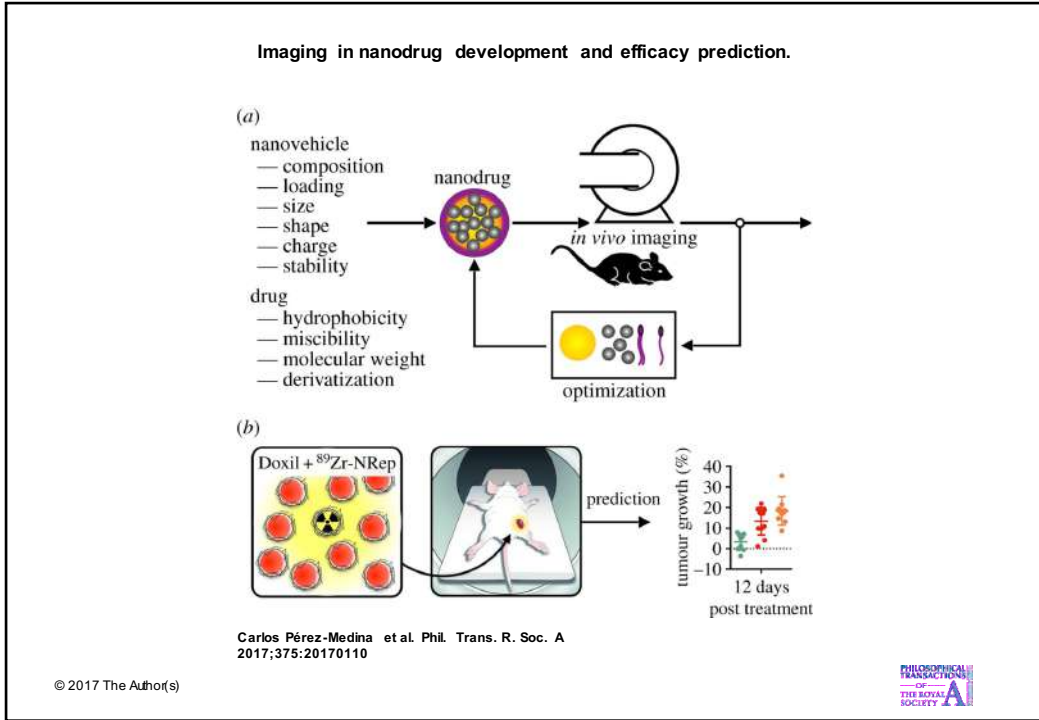


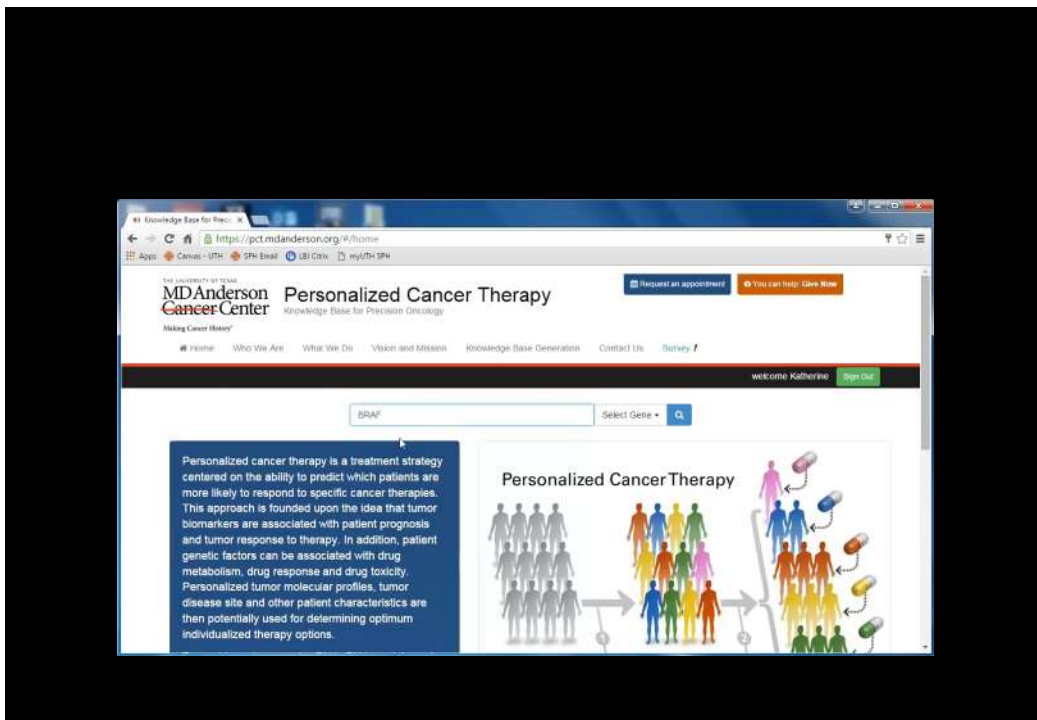
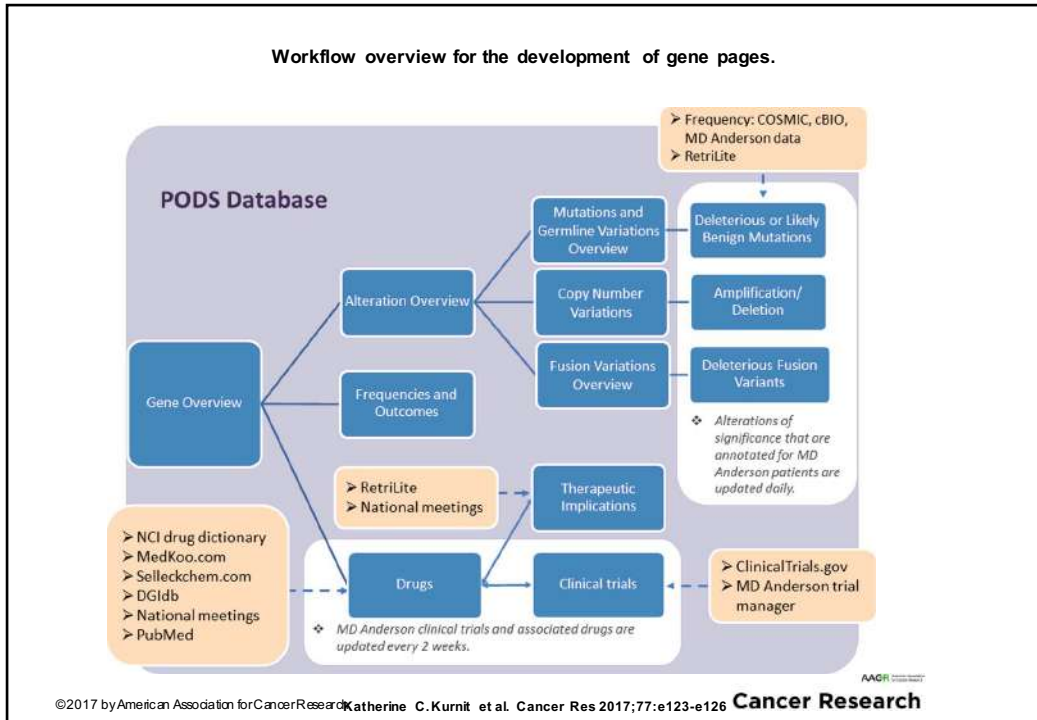
## Jewish Chronic Disease Hospital - 1963

- 22 elderly patients were injected with live human cancer cells
- purpose of experiment was to determine how long the foreign cancer cells would live in debilitated non-cancer patients compared to patients debilitated by cancer
- patients not told what the injection contained due to physician's concerns about "anxiety," "phobia and ignorance" about cancer in patients
- physicians claimed they had oral consent from each study participant









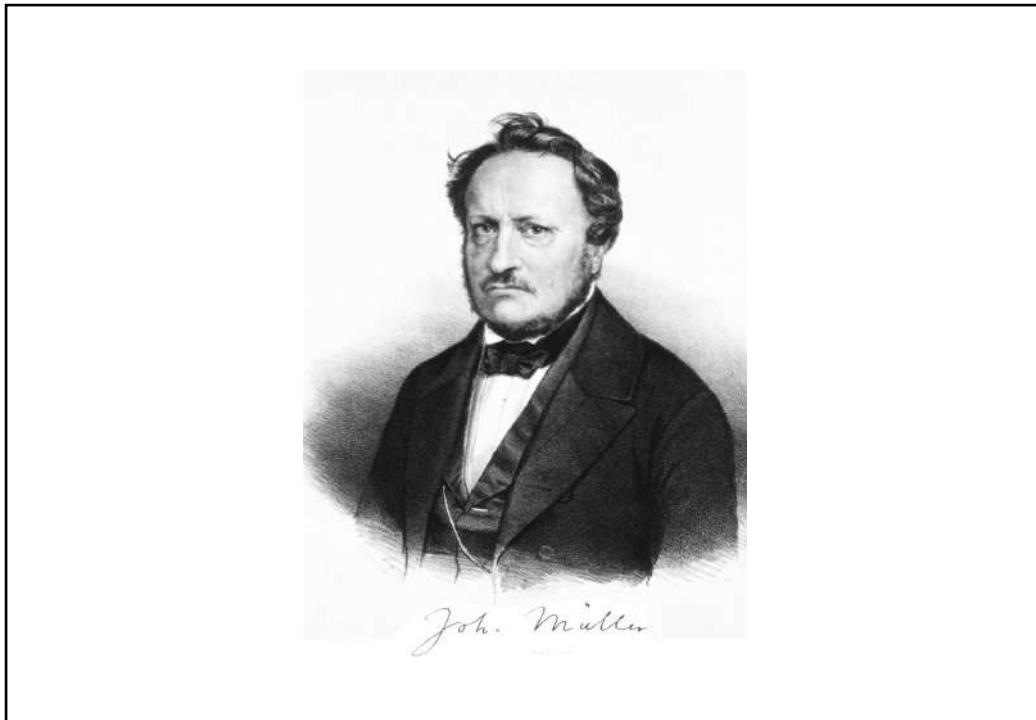


Table 5 | Patient-centered biomarker research

Patients needs	Biomarkers with clinical utility	Biomarkers with greatest 'promise' that require clinical validation
<b>Advanced-stage disease</b>		
<ul style="list-style-type: none"> <li>• Can I be sure that the chosen therapy will truly help me?</li> <li>• Can I avoid therapies with marked side effects for long periods of time?</li> </ul>	<ul style="list-style-type: none"> <li>• NONE</li> <li>• NONE</li> </ul>	<ul style="list-style-type: none"> <li>• HER2 PET (± FDG-PET); ctDNA?</li> <li>• HER2 PET; ctDNA?</li> </ul>
<b>Early stage disease</b>		
<ul style="list-style-type: none"> <li>• Can I be confident that chemotherapy and single HER2 blockade is good enough for me?</li> <li>• Can I do as well with a simpler or shorter treatment?</li> <li>• Can I forego (aggressive) chemotherapy?</li> </ul>	<ul style="list-style-type: none"> <li>• NONE</li> <li>• NONE</li> <li>• NONE</li> </ul>	<ul style="list-style-type: none"> <li>• Immune-gene signatures: a/o TILs</li> <li>• To be validated across large adjuvant trials such as ALTO/APHINITY (with a testing set and a validation set);</li> <li>• 8- Gene signatures (with high ESR1, intermediate HER2) to be tested in adjuvant trials of longer versus shorter trastuzumab duration;</li> <li>• PAM50 HER2-enriched subtype to be further validated with correlation to EFS</li> </ul>
<p>ctDNA, circulating tumour DNA; EFS, event-free survival; ESR1, oestrogen receptor; FDG, fluorodeoxyglucose; PAM50, Prediction Analysis of Microarray 50; TILs, tumour-infiltrating lymphocytes.</p>		
<p>Gingras, I. et al. (2017) HER2-positive breast cancer is lost in translation: time for patient-centered research  <i>Nat. Rev. Clin. Oncol.</i> doi:10.1038/nrclin.onc.2017.9.6</p>		