MeCo Score

A complementary diagnostic for
breast cancer bone metastasis risk and prevention

MeCo DIAGNOSTICS

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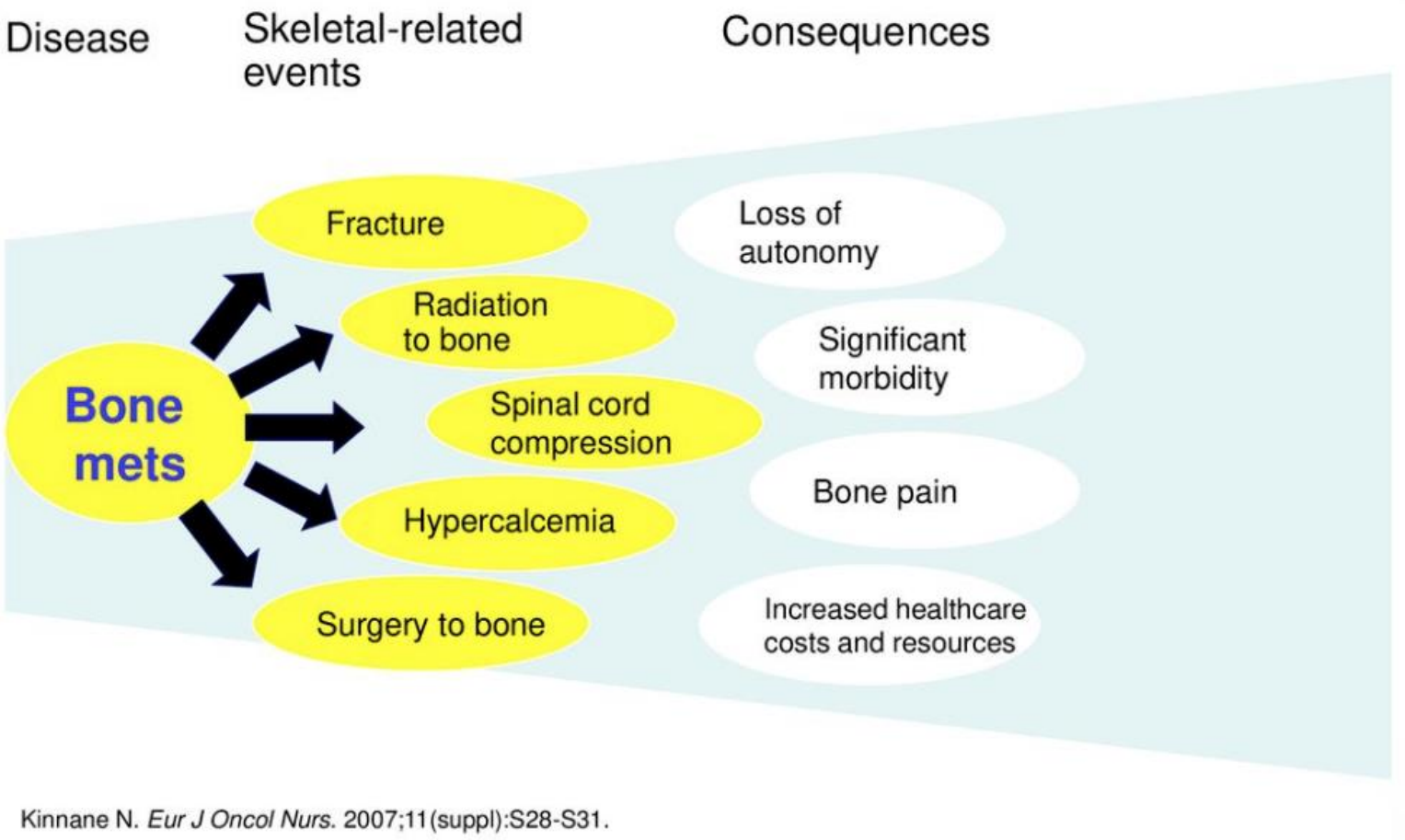
The Problem

Bone metastasis is the leading cause of breast cancer morbidity



Kinnane N. *Eur J Oncol Nurs.* 2007;11(suppl):S28-S31.

Bone metastasis is generally incurable and affects ~75% of patients with metastatic disease

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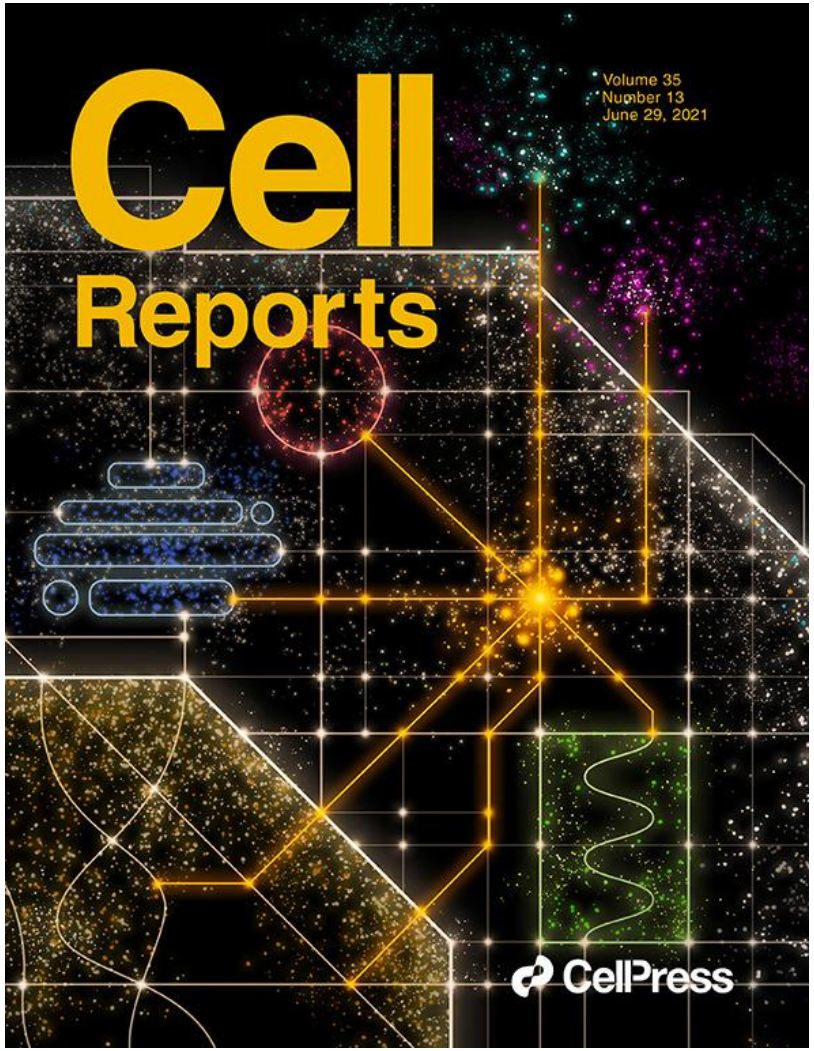
Our proof-of-principle publication



Our main findings:

- Breast cancer cells can become responsive to tumor stiffness, leading to a phenomenon called “mechanical conditioning.”

- We can quantify mechanical conditioning using a sophisticated algorithm we invented called the MeCo score.

- Mechanical conditioning instructs breast cancer bone metastasis in animal models.

- Breast cancer patients with high MeCo scores are more likely to develop bone metastasis.

https://doi.org/10.1016/j.celrep.2021.109293

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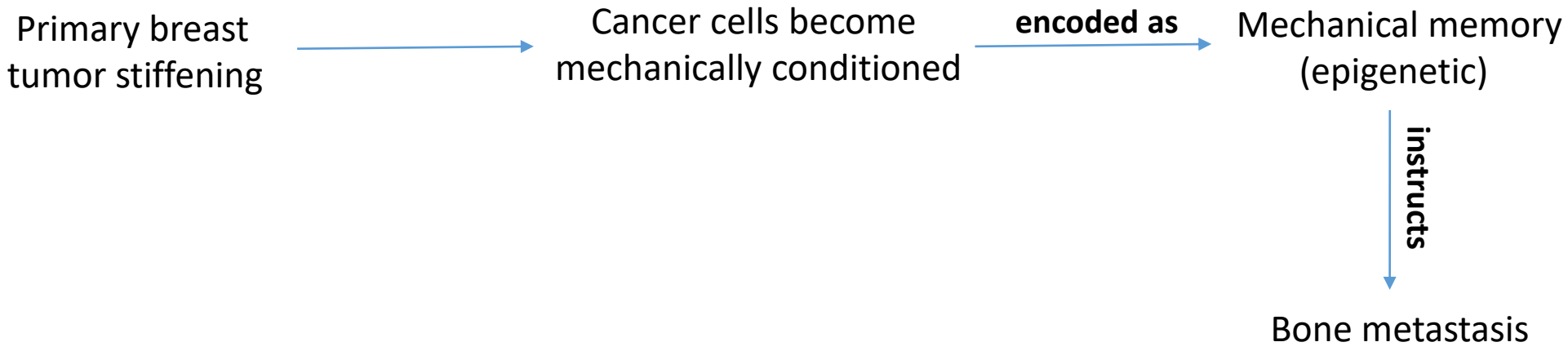
Why do we measure mechanical conditioning using the MeCo score?



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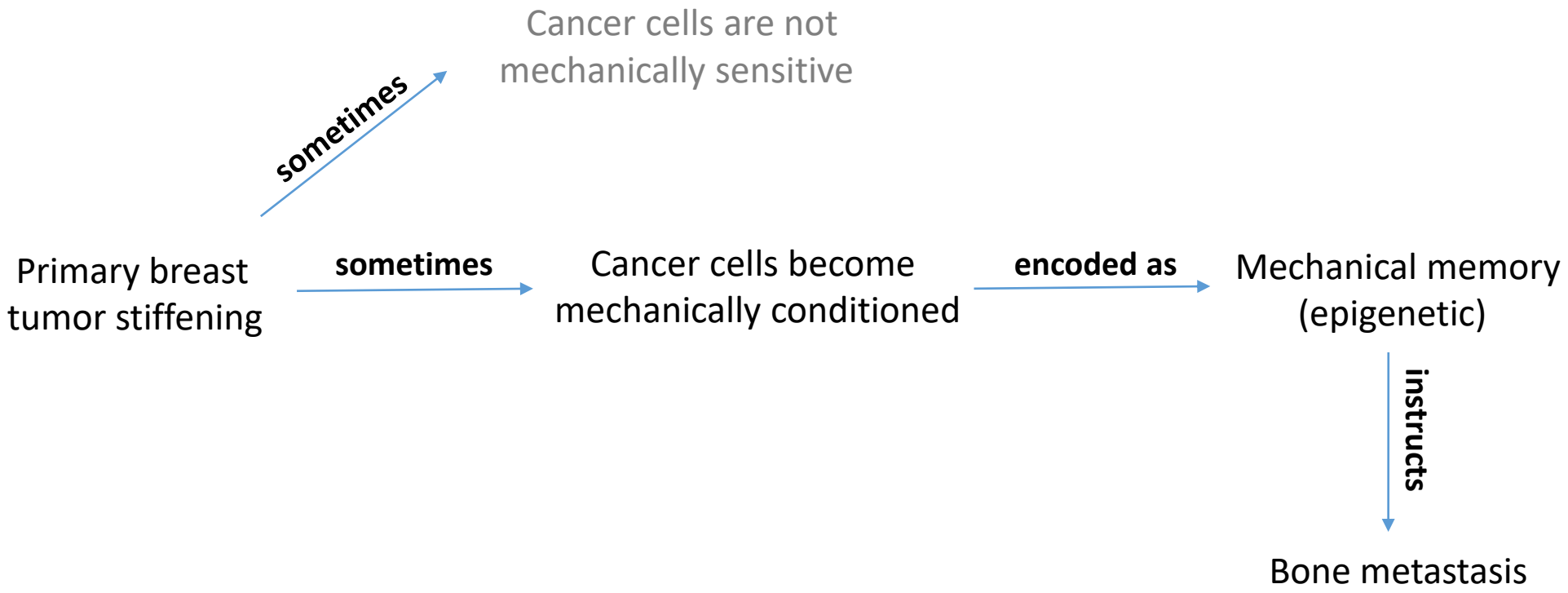
Why do we NOT measure tumor stiffness?



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We aim to treat the underlying cause in high-risk patients

RISK

Primary breast tumor stiffening → Cancer cells become mechanically conditioned **encoded as** → Mechanical memory (epigenetic) **instructs** → Bone metastasis

Cancer cells become mechanically conditioned → MeCo score calculated from biopsy or lumpectomy → Identify patients with high scores → Treat with repurposed anti-fibrotic drugs ⊣ Primary breast tumor stiffening

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Advantages of drug repurposing

Benefits for patients

- Lower drug costs (ie. generics are emergent)
- Excellent drug tolerability and long-term safety

Benefits for MeCo Diagnostics' investors:

- Higher likelihood of regulatory approval (70% less risk)
- 85% lower R&D costs
- We can skip IND application and Phase I clinical trials

2 FDA-approved anti-fibrotics:

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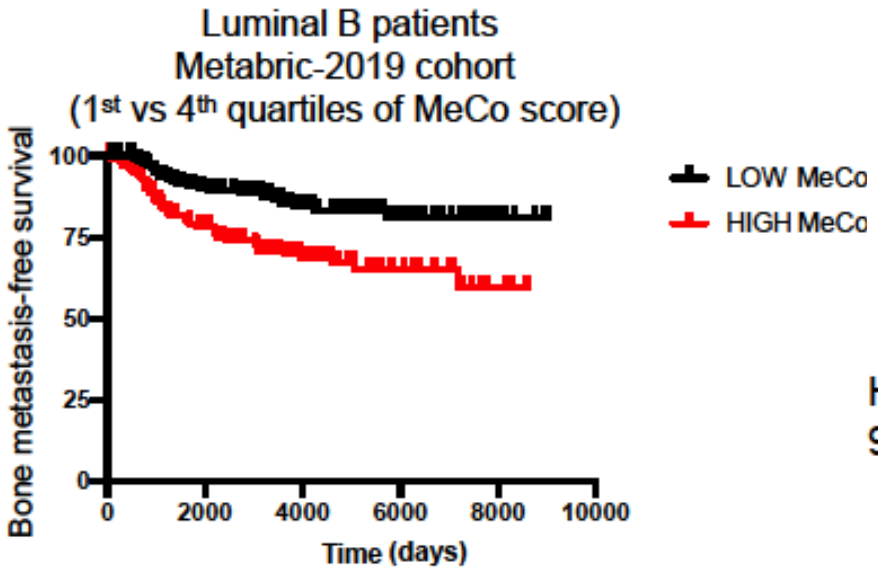
Source Naylor S, JM. S. (2014) Therapeutic Drug Repurposing: repositioning and rescue. Drug Discovery World

MeCo score performance



*Luminal B subtype patients have the highest rate of bone metastasis (i.e. most clinically-relevant cohort)

Hazard Ratio (log-rank) = 2.330
95% CI, 1.462 to 3.713

Log-rank (Mantel-Cox): ***p=0.0006

Number of Luminal B patients with bone metastasis
Low MeCo-refined: 23 out of 169 patients (bottom quartile)
High MeCo-refined: 48 out of 169 patients (top quartile)

In this large validation cohort, Luminal B subtype patients with high MeCo scores were more than twice as likely to develop bone metastasis

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For other subtypes see: https://doi.org/10.1016/j.celrep.2021.109293

MeCo score vs. other bone metastasis signatures

Validated *in vivo*?	Optimized using clinical data?		Training cohort		Validation cohorts		Validated against 1000 random signatures?	Candidate complementary therapeutics?
			BMFS *	TTBM **	#1 BMFS	#2 BMFS		
Yes	No	**Src-responsive signature SRS (Zhang)**	Yes	N/A	N/A	N/A	No	Poor outcomes
Yes	No	**CAF+ (Zhang)**	N/A	N/A	Yes (TNBC only)	N/A	No	Yes
Yes	No	**102-gene signature (Kang)**	Yes (ER- only)	N/A	Yes (ER- only)	N/A	No	Too many targets
No	Yes	**15-gene signature (Savci-Heijink)**	Yes	N/A	Yes	N/A	No	No drugs available
Yes	Yes	**MeCo**	Yes (subtype optimized)	Yes	Yes	Yes	Yes	Yes

*BMFS: Bone metastasis-free survival

** TTBM: Time to bone metastasis

TNBC: Triple negative breast cancer

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Reference PMIDs: 26965286, 19573813, 30613635, 23993096

Impact Opportunity for MeCo score:
Breast Cancer Incidence Rates US/UK

- Breast cancer is the **most common** type of cancer at a global level, with new cases surpassing **2.3 million**
- Within the United States (2019)
  - **New Cases**: 268,600
  - Existing Cases: 3,800,000
- Within the United Kingdom (2020)
  - **New Cases**: 55,000
  - Existing Cases: 600,000
- Of new diagnoses 96% will be stages 1-3 (64% local 27% regional 4% metastatic)
  - United States:
    - **Early Stage: 257,856**
  - United Kingdom:
    - **Early Stage: 52,800**

- MeCo score can benefit in **early-stage** cancer populations (preventative)
  - Early Stage: **300,000 annually in US/UK**

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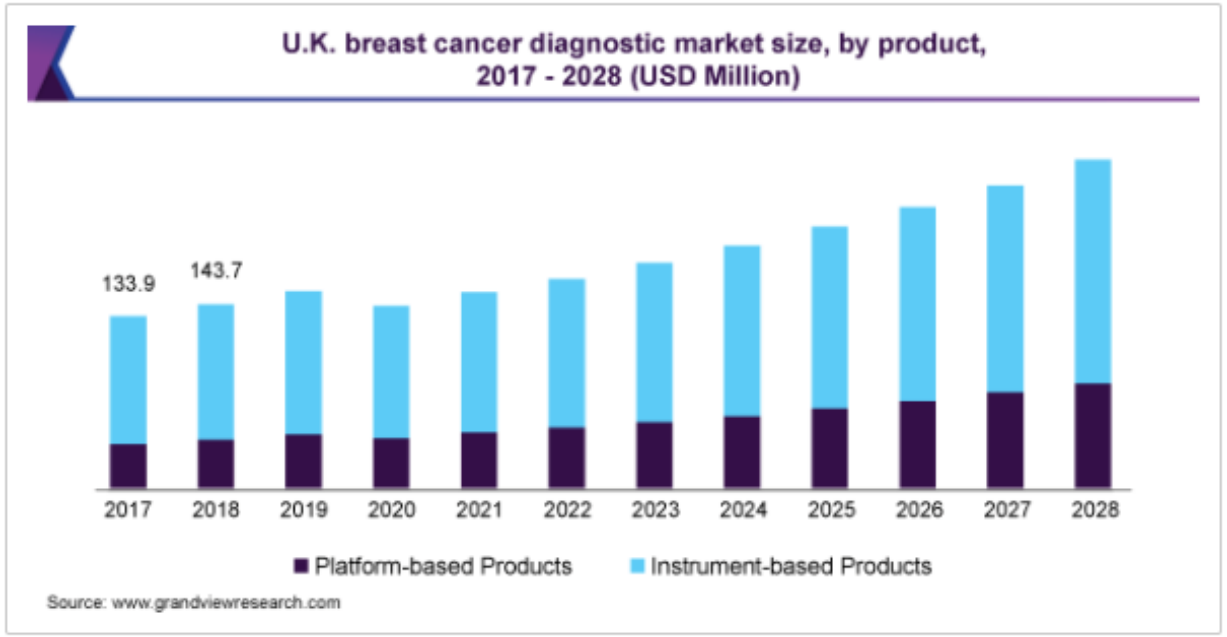
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/breast-cancer-facts-and-figures-2019-2020.pdf

Diagnostics Market Size and Potential:

Annual Tests and Sales of Similar Diagnostics

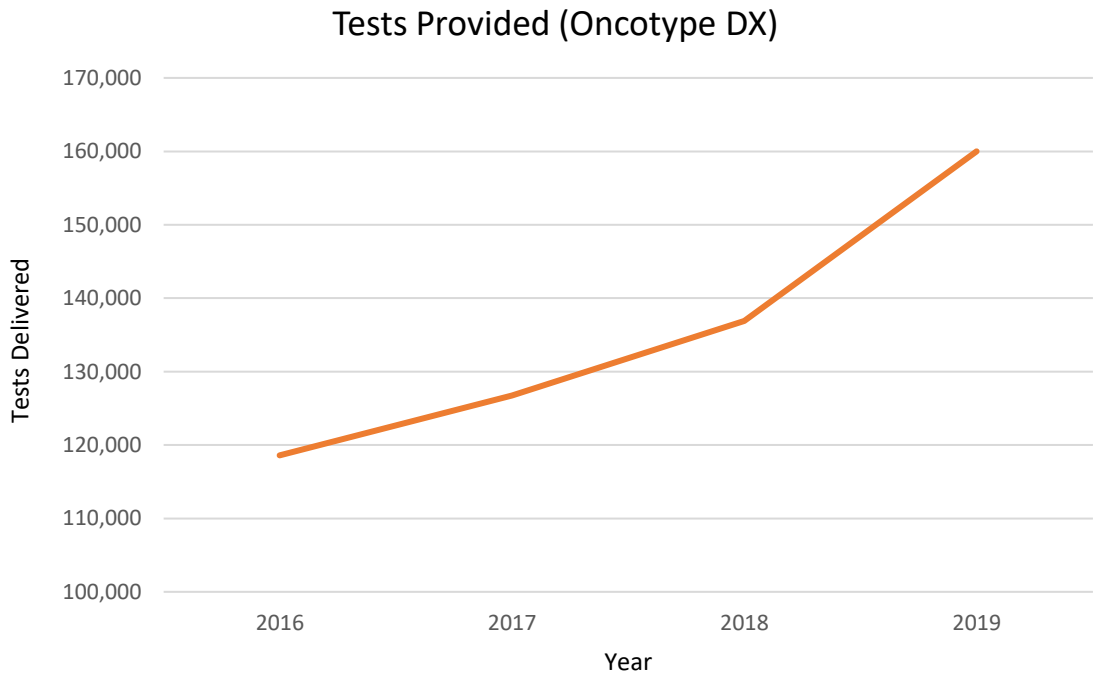
- The global breast cancer diagnostics market size was valued at **$3.9 billion USD** in 2020 and is expected to expand to **$6.3 billion USD** by 2028
- Within the UK, the market is following a similar trend: **$145 M** which will almost double by 2028
- Growth can be attributed to the **increasing prevalence** of breast cancer and rising government initiatives to **increase the screening and diagnosis** rate.



https://www.grandviewresearch.com/industry-analysis/breast-cancer-diagnostics-market

Acquisitions and Performance of Similar Companies

- **Oncotype DX** scores suggests the effectiveness of chemotherapy (ie. toxic drugs) as an early-stage treatment to prevent breast cancer recurrence
- Owned by **Genomic Health** which was acquired by **Exact Sciences** in November of 2019 for **$2.5 Billion**
- In 2019 Oncotype DX earned over **$330,000,000** in revenue
- **The MeCo score** will not compete with **Oncotype DX** or any other approved breast cancer diagnostic because they offer different value propositions, and the MeCo score leverages non-toxic drugs.



https://www.sec.gov/ix?doc=/Archives/edgar/data/0001124140/000112414020000010/exas-20191231.htm