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Scientific Innovation Driving Precision Medicine

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Bay Area Council | Delivering on the Promise of Personalized Medicine

February 25 2016

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Personalized Health Care [PHC] is a cornerstone of the Genentech / Roche strategy

Our understanding of complex diseases is changing medical practice and how we develop new medicines

New paradigms for molecular diagnoses of cancers are emerging

Conclusions

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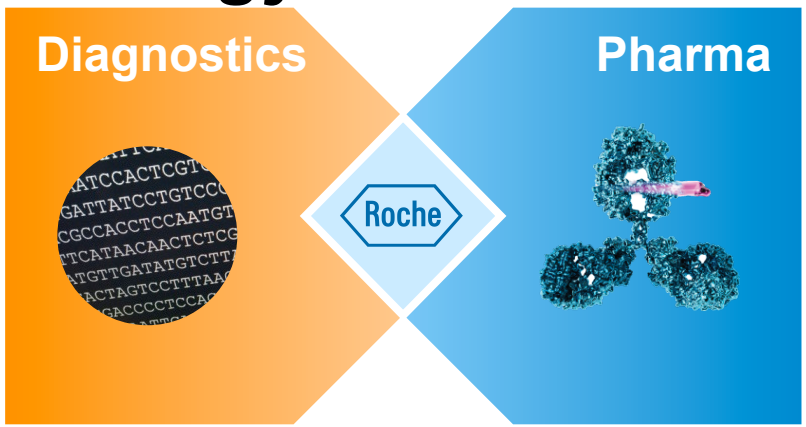
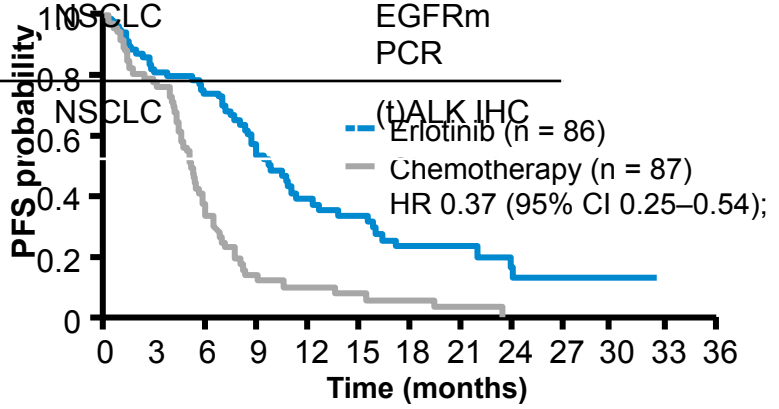
Personalized Healthcare
A cornerstone of the Genentech / Roche strategy



Molecule	Indication	CDx
Herceptin	Her2+ breast cancer	Her2 IHC
Kadcyla	Her2+ breast cancer	Her2 IHC
Perjeta	Her2+ breast cancer	Her2 IHC
Vemurafenib	Melanoma	BRAFm PCR
Tarceva	NSCLC	EGFRm PCR
Alectinib	NSCLC	(t)ALK IHC

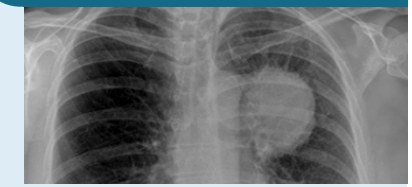


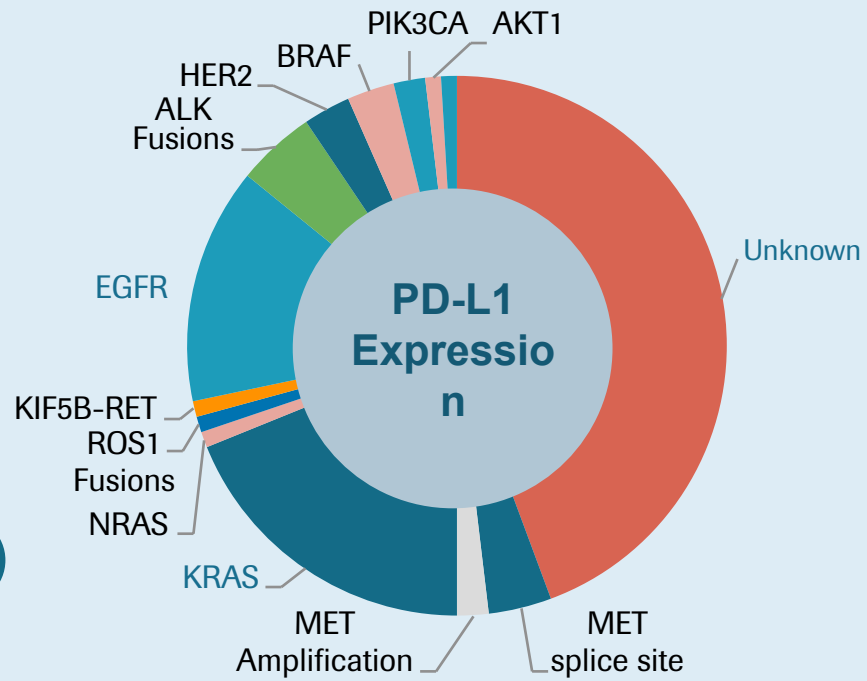
60% of pipeline projects are being developed with companion or complimentary diagnostic

New opportunities and challenges

Clinical Decisior 3

4 Clinical Monitoring





Molecular tests
e.g., EGFR; ALK 2

1 Patient

- Fundamental shift to comprehensive diagnostics
- Fundamental shift in evidence of therapeutic benefit

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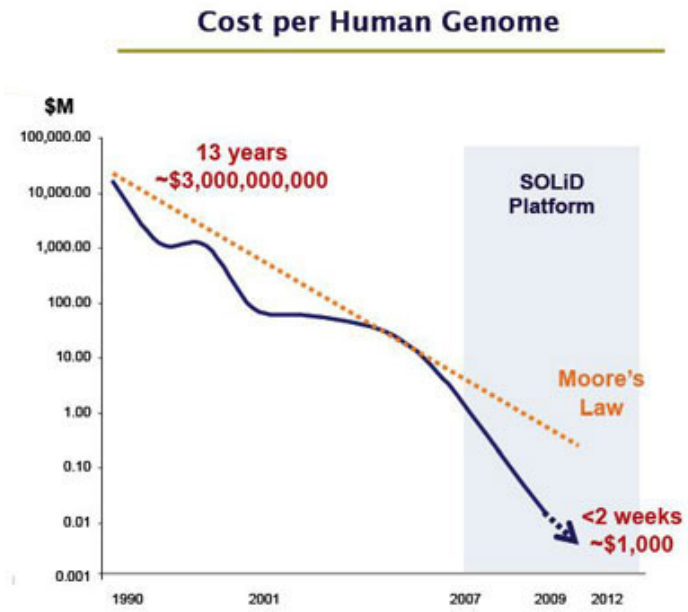
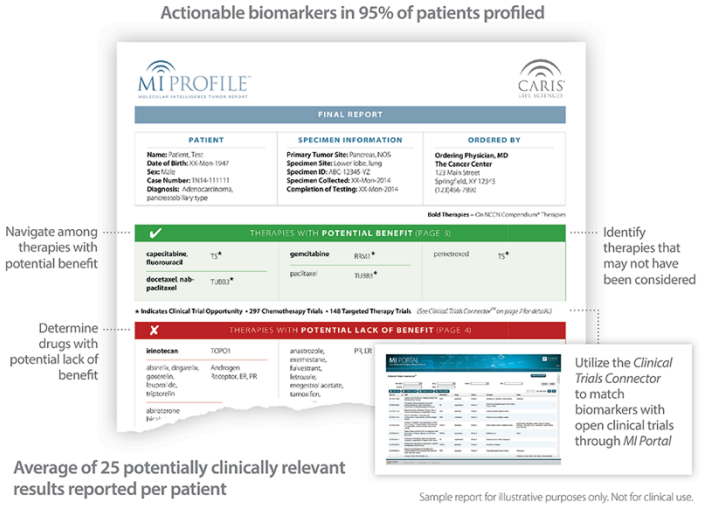
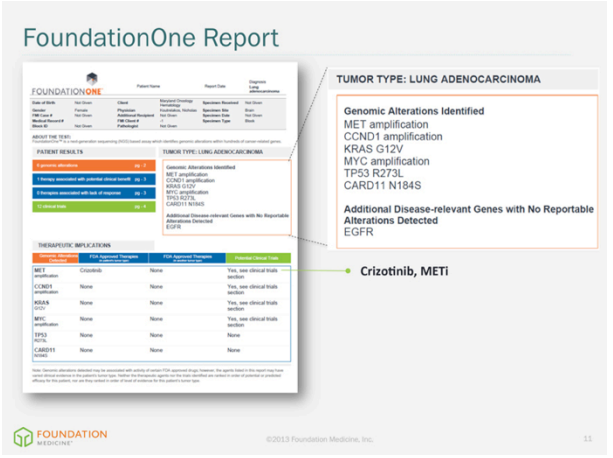
Evolving medical practice

Comprehensive diagnostics are becoming a reality for s





CARIS LIFE SCIENCES



MAYO CLINIC

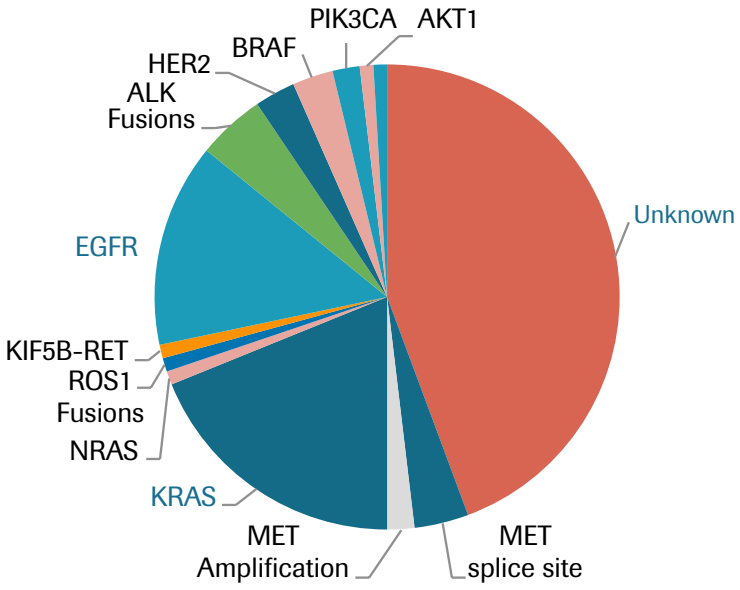
Memorial Sloan-Kettering Cancer Center
The Best Cancer Care. Anywhere.

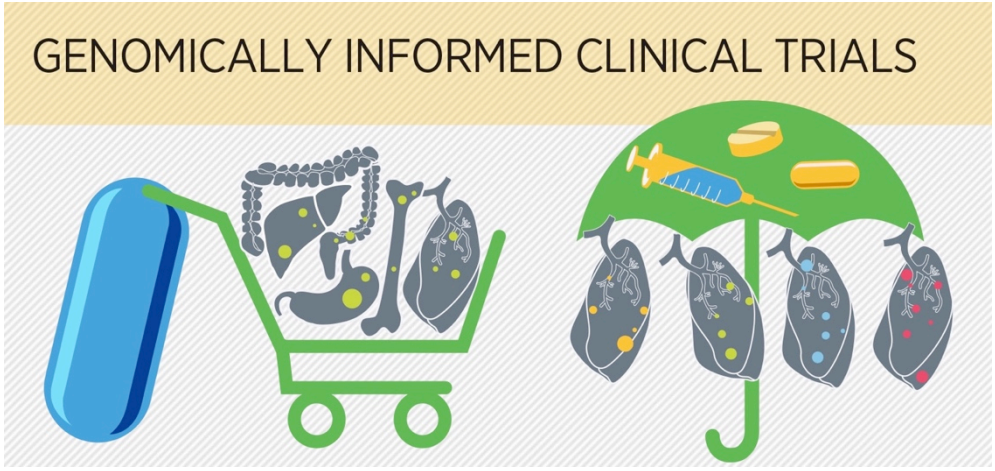
FOUNDATION MEDICINE

Cancer Treatment Centers of America

MASSACHUSETTS GENERAL HOSPITAL
RESEARCH INSTITUTE

New clinical trial designs
Evidence of benefit in small populations





Trial Type	# of Drugs Tested	Disease Type	# of Mutations
Umbrella Trial	Many	One	Many
Basket Trial	One	Many	One

Basket and umbrella trials are much better for developing precision medicines than traditional randomized trials

Image Source: CancerProgressReport.org

Zelboraf BRAF V600 VE-Basket Study

Histology independent basket trial

Solid tumors with BRAF mutations

Zelboraf

	N	RR
NSCLC	20	42 %
Cholangio Ca.	8	13 %
All Others	19	37 %
ECD/LCH*	26	60 %
Anapl. Thyroid	7	29 %
Breast	NS	-
Ovarian	NS	-
Myeloma	9	22 %
Colorectal	10	0%

V
V+C

Updated from Hyman et al. N Engl J Med 2015; 373:726
*ECD Erdheim Chester Disease, LCH Langerhans' cell histiocytosis; ** Zelboraf + cetuximab

New opportunities and challenges

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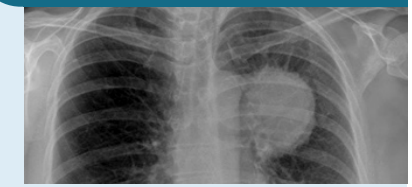

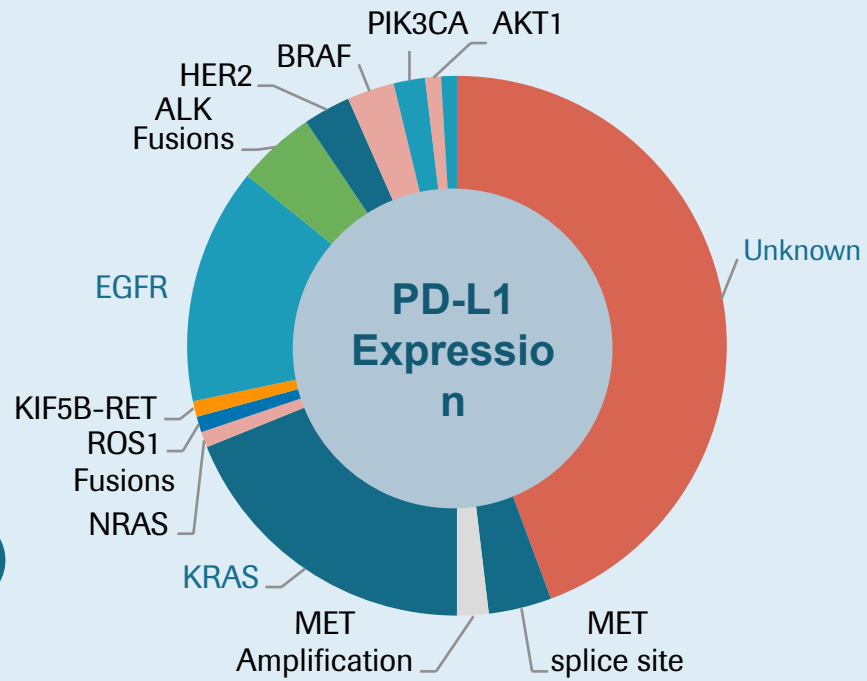

Molecular tests
e.g., EGFR; ALK 2

1 Patient

- Often limited tissue = no ability to identify “actionable” mutations
- Monitoring is cumbersome and time is critical

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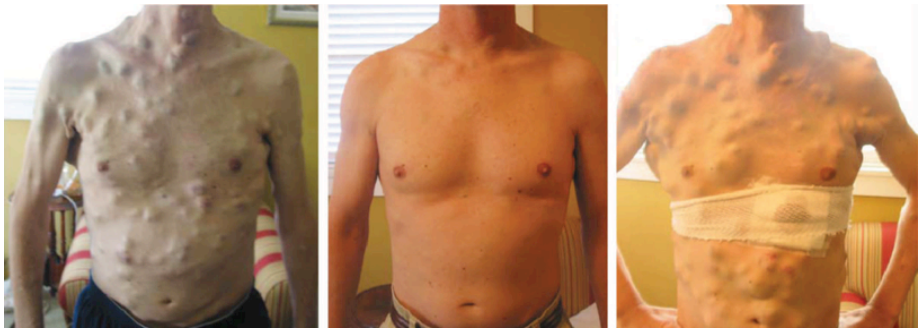
Resistance to therapy

Can we identify earlier and adapt therapy?

Time



Clinical diagnosis

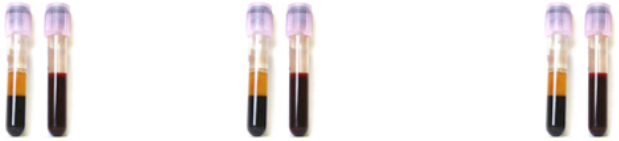
[mM BRAFm]

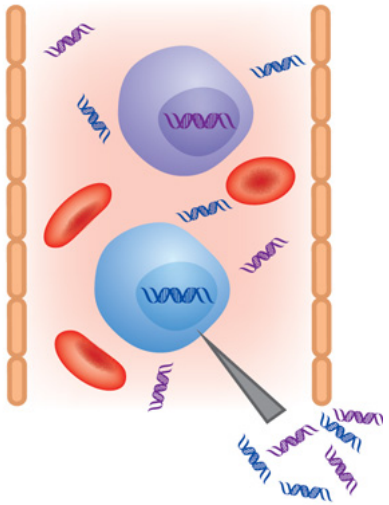
Treatment

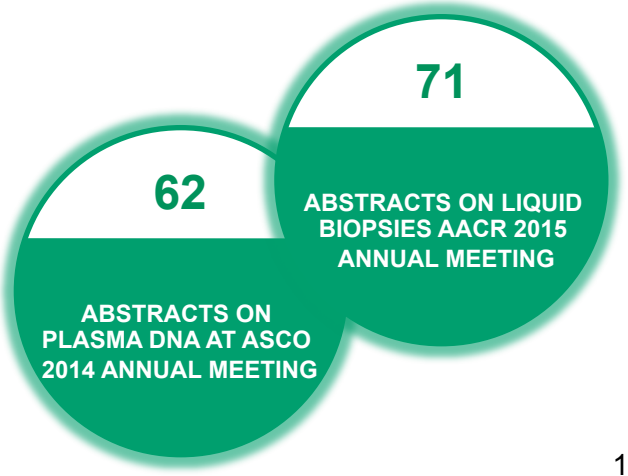
[Zelboraf]

Resistance

Find resistance before clinical evidence?







Chapman et al N. Engl. J. Med. 2011: 364:2507-2016

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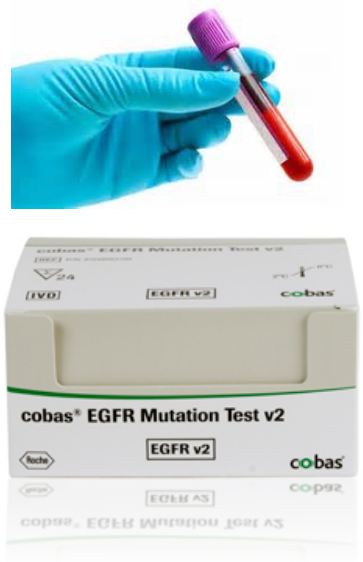
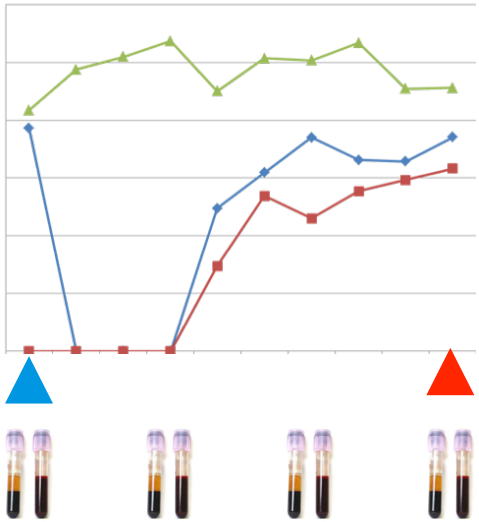
Comprehensive diagnosis and monitoring
Blood-based tools to identify and monitor patients

Liquid (blood) biopsies at diagnosis



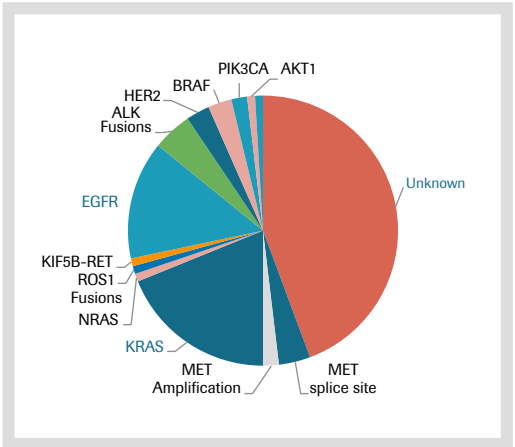
Liquid biopsies during treatment e.g. EGFR



Co-development of a cfDNA product with FMI

Adapted from: Sorenson et al Cancer 2014;120:3896-901

Conclusions



Transformational Time

Patient "journey" is evolving

Personalized Healthcare

Doing now what patients need next