

Molecular markers for early detection

miR-Test: A Blood Test for Lung Cancer Early Detection

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15-18 April 2015, Geneva, Switzerland

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Disclosure slide

- Our department is the recipient of a sponsored research fund from a privately held molecular diagnostic company (Gensignia Life Sciences, Inc.). The research fund in object was conferred after the termination of the experimental work herein described.
- I am a co-inventor on a patent application regarding the diagnostic miRNA-based blood signatures described herein (WO2012089630 A1).



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Outline

- *Introduction on microRNA*
- *Development of a microRNA-based blood test (miR-Test) for lung cancer early detection.*
- *Validation of miR-Test in a LDCT screening trial.*



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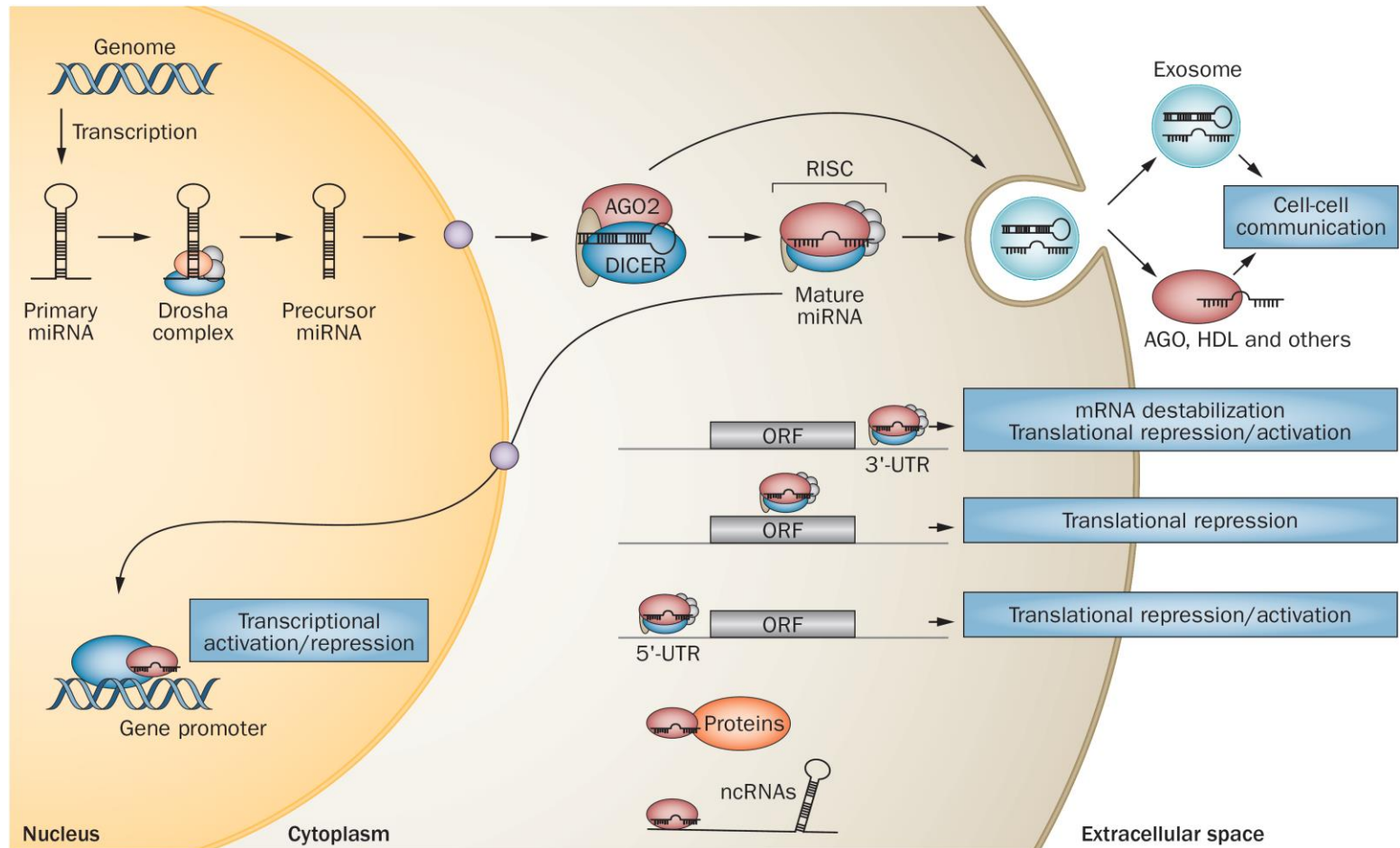
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Biogenesis and diverse functions of miRNAs



Adapted from Schwarzenbach et al., Nature Rev. Clin. Oncol., 2014



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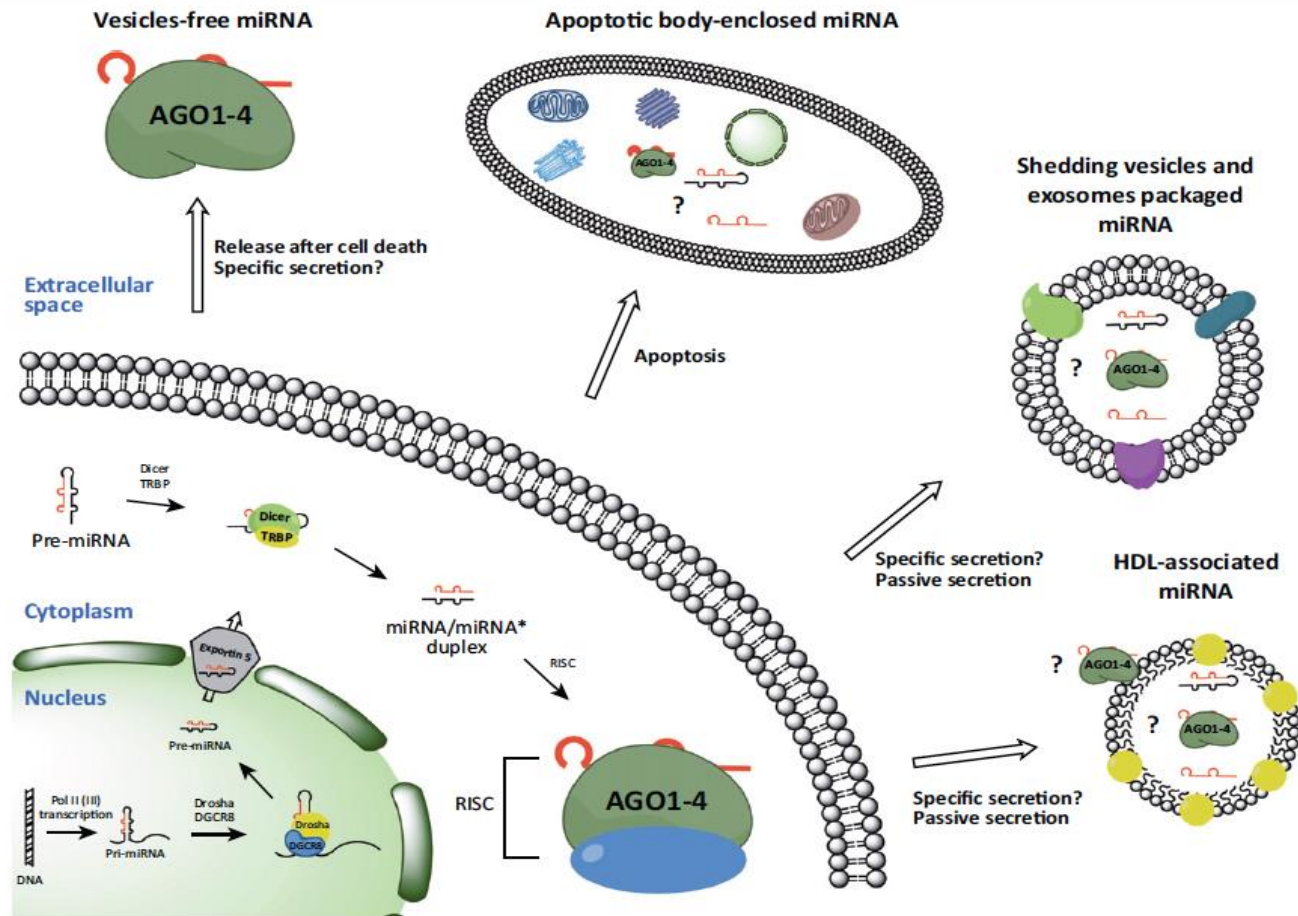
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Mechanisms of release of extracellular miRNAs



Trends in Biochemical Sciences November 2012, Vol. 37, No. 11



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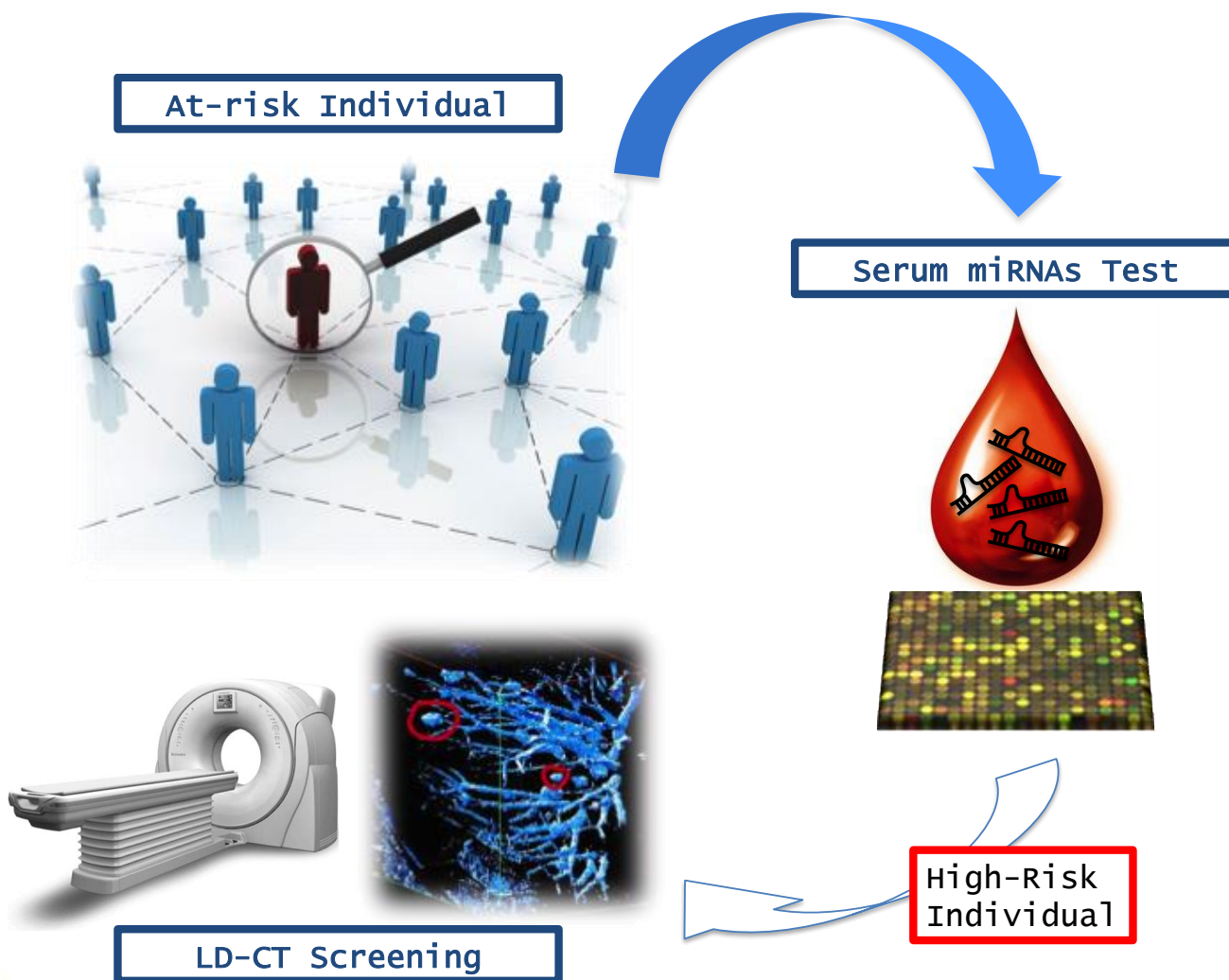
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Circulating miRNA screening to select high-risk individuals



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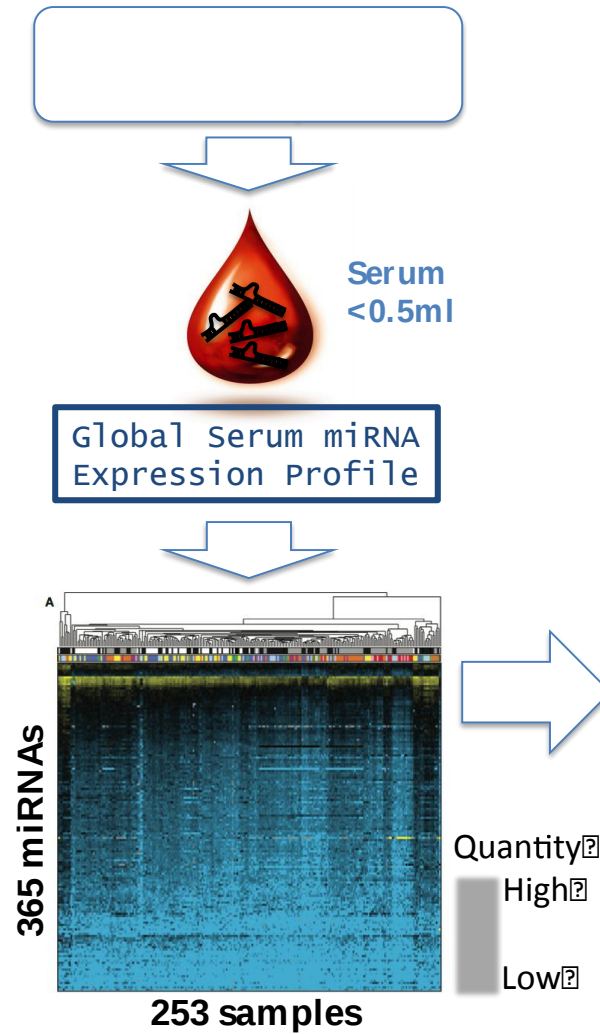


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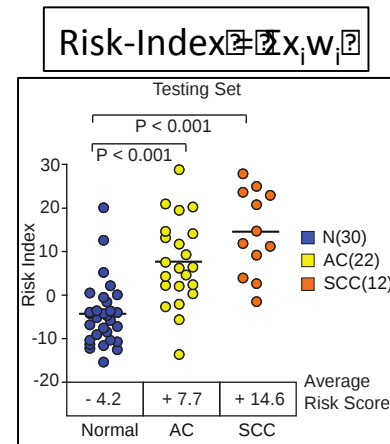


miR-Test Development

DISCOVERY PHASE



IEO serum miRNA-test 34-miRNA signature



- Normal
- Adenocarcinoma (AC)
- Squamous Cell Carcinoma (SCC)

Bianchi et al. *EMBO Mol Med* 3(8):2011

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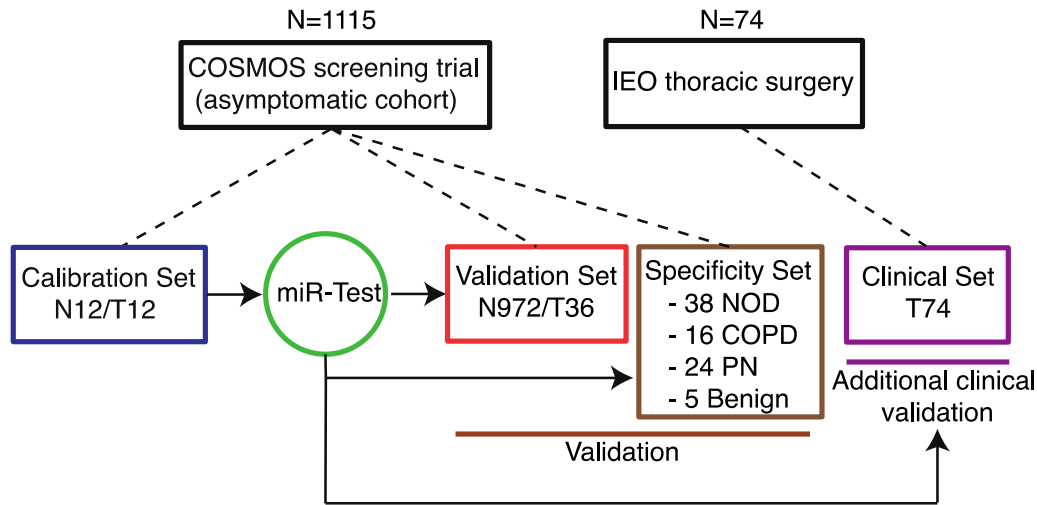


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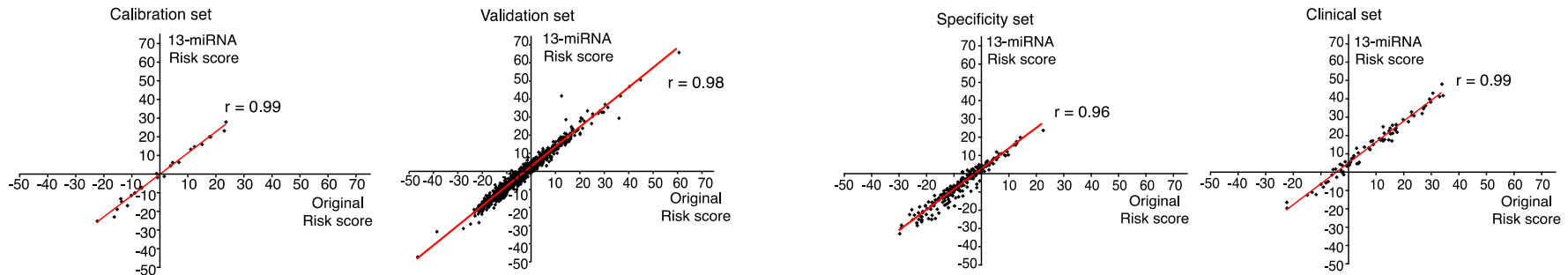


miR-Test Development

1. Overall study design:



2. miR-Test simplification (from 34 to 13 miRNAs)



Montani et al. J Natl Cancer Inst. 2015 Mar 19;107(6).

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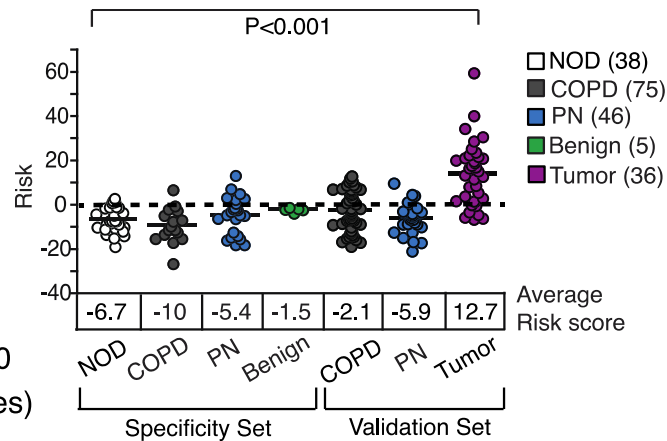
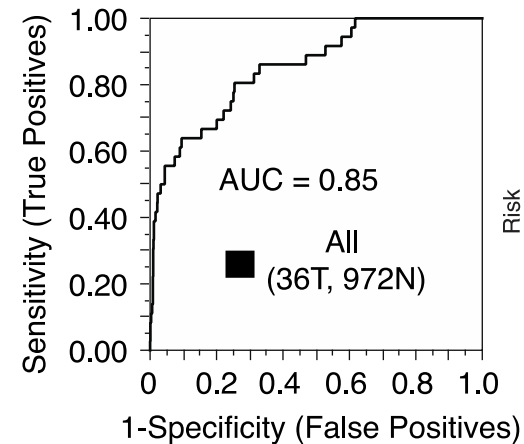
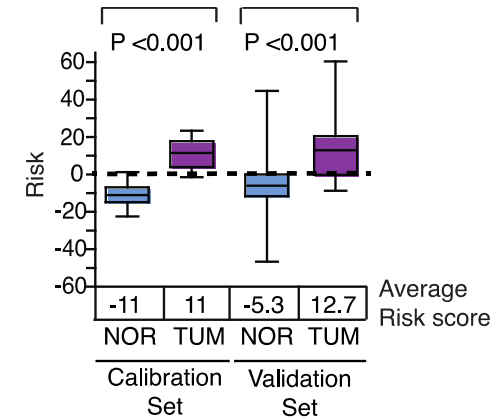
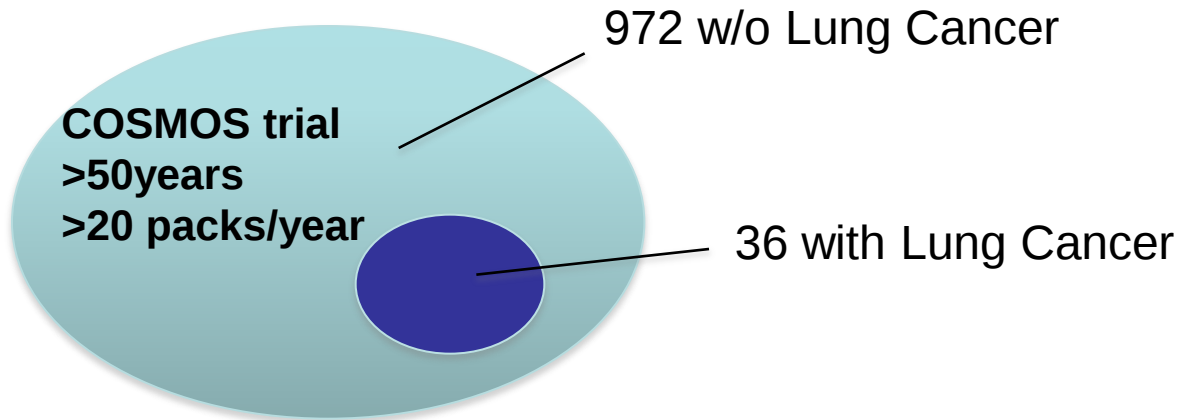


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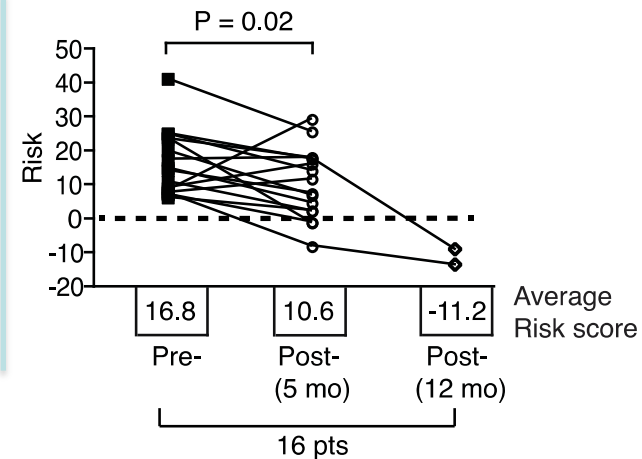


miR-Test Development

3. miR-Test validation (LDCT screening trial):



Pre-Post Surgery



Montani et al. J Natl Cancer Inst. 2015 Mar 19;107(6).



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Summary

miR-Test performance in all CT screened individuals (N=1115):

- 820 individuals were miR-Test negative (NPV>99%).
- Of the 295 miR-Test positive, 38 out of 48 had cancer (SE, 79%).

Outlook:

- Today: 10.000 CT exams to detect 100 tumors in a high-risk population.
- Tomorrow: 2455 CT exams in **miR-Test positive subjects** to detect 79 tumors or 3108 CT exams to detect 100 tumors in a high-risk population.



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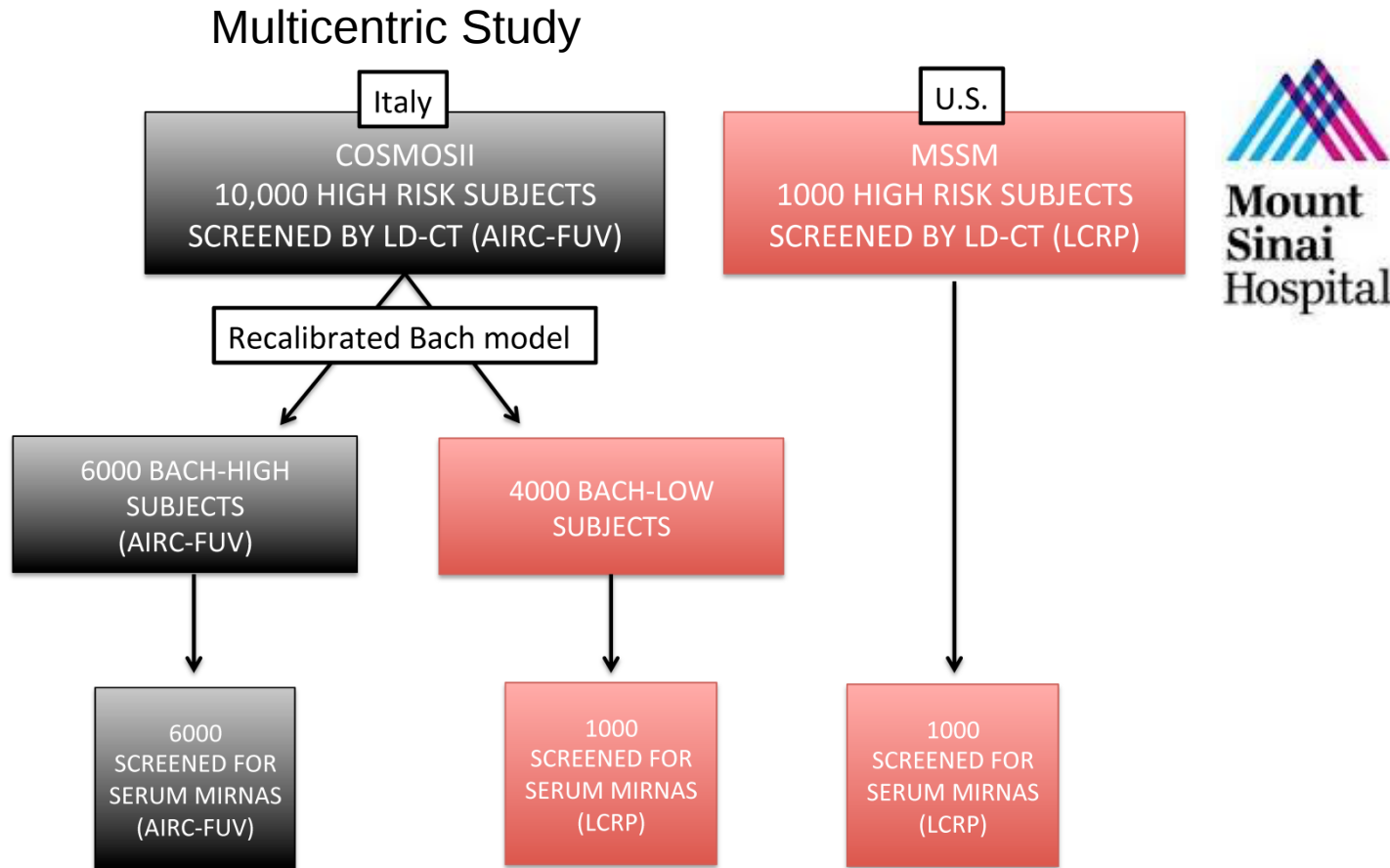
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High-risk individuals screened by LDCT and miR-Test: the COSMOS-II trial (results expected in 2017)



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Acknowledgments



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