


CENTER FOR
CANCER
RESEARCH

Connecting the Cancer Community




• Innovative Science

• Breakthrough Therapies

• Clinical Advances


MicroRNAs and Cytokines in Cancer Diagnosis, Prognosis and Therapeutic Outcome




TECH
Council MD

TEDCO/NIH/NCI Technology Showcase


Curtis C. Harris
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Maryland
TEDCO
Technology Development Corporation



NATIONAL INSTITUTES
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CENTER FOR CANCER RESEARCH

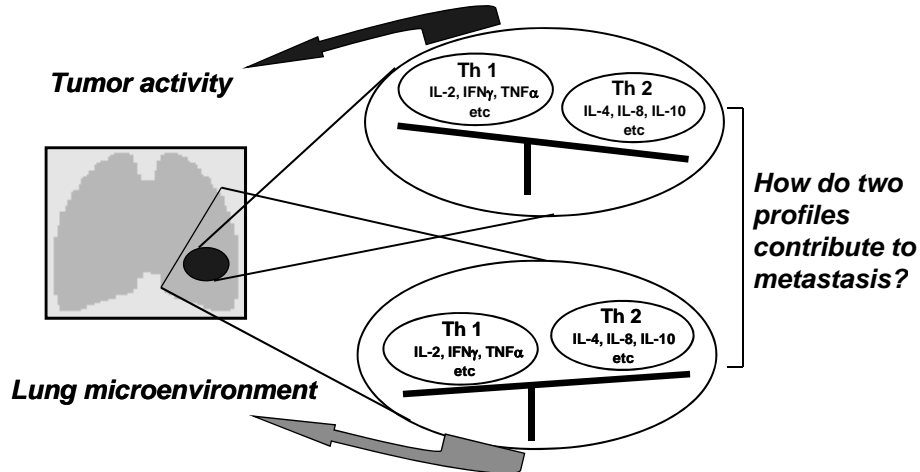


Technology

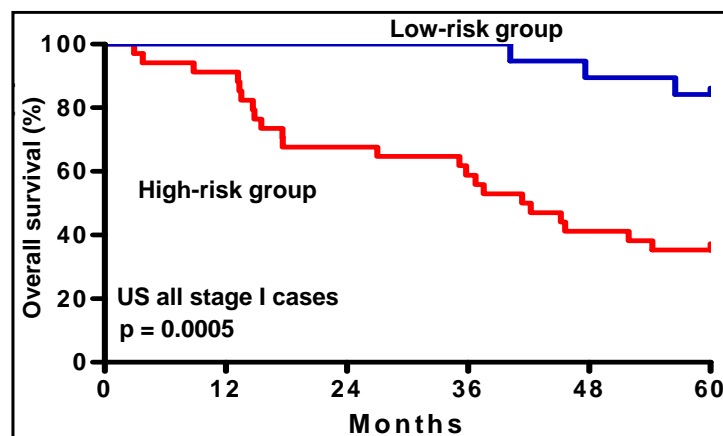
- **Cytokines**
 - Proteins secreted from both inflammatory cells and cancer cells.
 - They can either inhibit or enhance cancer growth.
 - Cytokine mRNA can be readily measured by microarray and real-time polymerase chain reaction (RT-PCR) technologies. Proteins can be measured by immunoassays.
- **MicroRNA**
 - Small non-coding RNAs that are evolutionarily conserved and regulate protein expression.
 - They can either inhibit or enhance tumor growth.
 - They can be readily measured by microarray and real-time polymerase chain reaction (RT-PCR) technologies.

Cytokine Hypothesis:

- Metastatic propensity of lung cancer may be influenced by the local lung environment of the host.

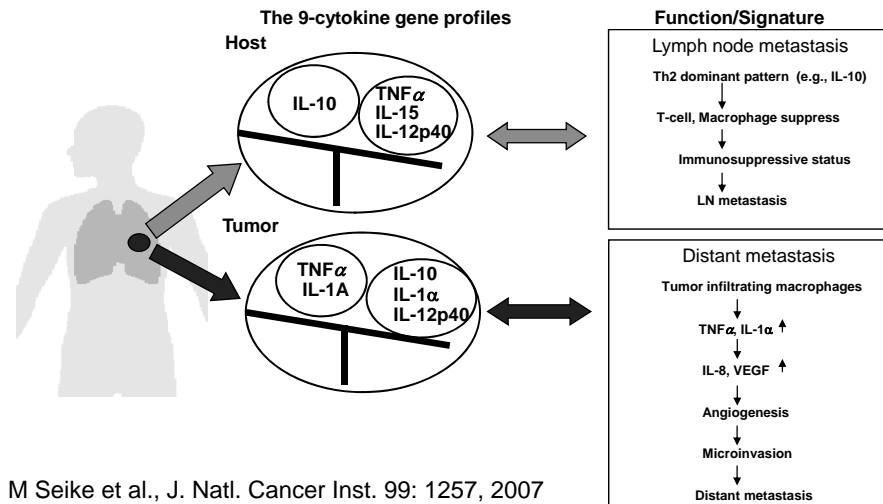


Cytokine Profile (CLASS-11) Predicts Survival of Early Stage (Stage 1) Lung Adenocarcinoma



M Seike et al., J. Natl. Cancer Inst. 99: 1257, 2007

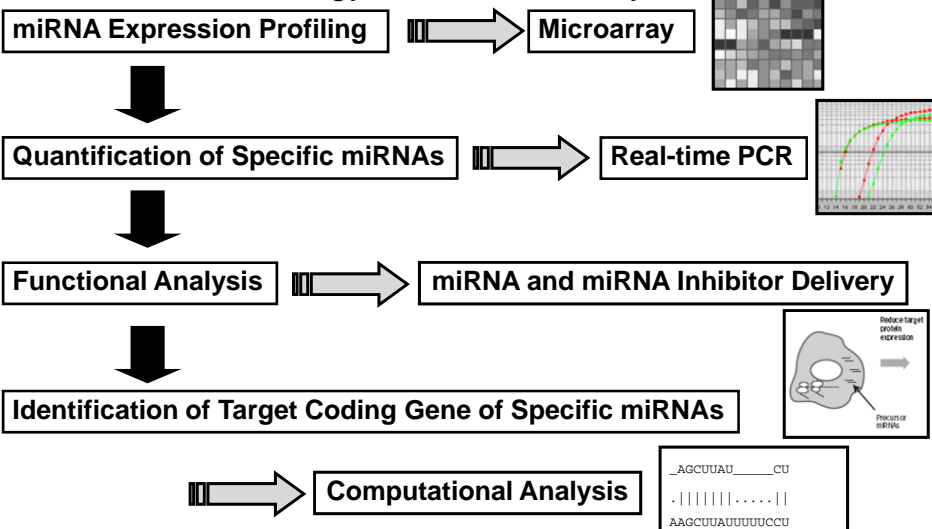
Survival is Predicted by the CLASS-11 Cytokine Gene Profile



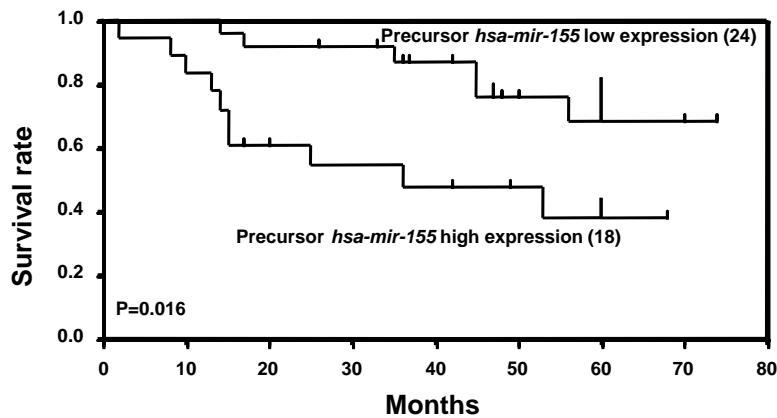
Technology Applications



Strategy MicroRNA Analysis



Kaplan-Meier Survival Curves for Stage 1 Adenocarcinoma Patients Analyzed by miRNA Real-Time (RT-PCR) Analysis



N Yanaihara et al., Cancer Cell 9: 189, 2006

Commercial Applications

Clinical Implications of Cytokine and MicroRNA Expression in Human Cancer

- Diagnosis of cancer.
- Prediction of prognosis, including Stage 1.
- Prediction of therapeutic outcome.
- Identification of molecular targets.
- MicroRNAs and cytokines as therapeutic targets.
- Insight into signaling pathways involved in carcinogenesis and tumor progression.

Late Breaking News:

MicroRNAs Predict Colon Cancer Diagnosis, Prognosis And Therapeutic Outcome

- miRNA expression in colon tumors is altered in systematic ways.
 - **miR-21 expression is increased in adenomas.**
 - **More advanced tumors express higher levels of miR-21.**
- High miR-21 expression in tumors is an independent prognostic biomarker in two different cohorts.
- High miR-21 expression in tumors predicts poor therapeutic outcome.
- If causal to carcinogenesis, miRNAs may be novel cancer therapeutic and chemopreventive targets.
 - **Hypothesis: antagamirs of miR-21 could cooperate with other forms of cancer therapy**

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Collaboration Opportunities

- **Both licensing and CRADA opportunities are available.**

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