

ACC.24

MiRNA-137 and MiRNA-106b are Novel Myocardial Ischemia/Inflammation-dependent Biomarkers with High Diagnostic Sensitivity and Specificity for Acute Coronary Syndrome (ACS)

Salwa A. Elgebaly, PhD, FACC

University of Connecticut School of
Medicine, Department of Surgery

Founder & CEO - Nour Heart, Inc.

elgebaly@uchc.edu & selgebaly@nourheart.com



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Background / Unmet Need

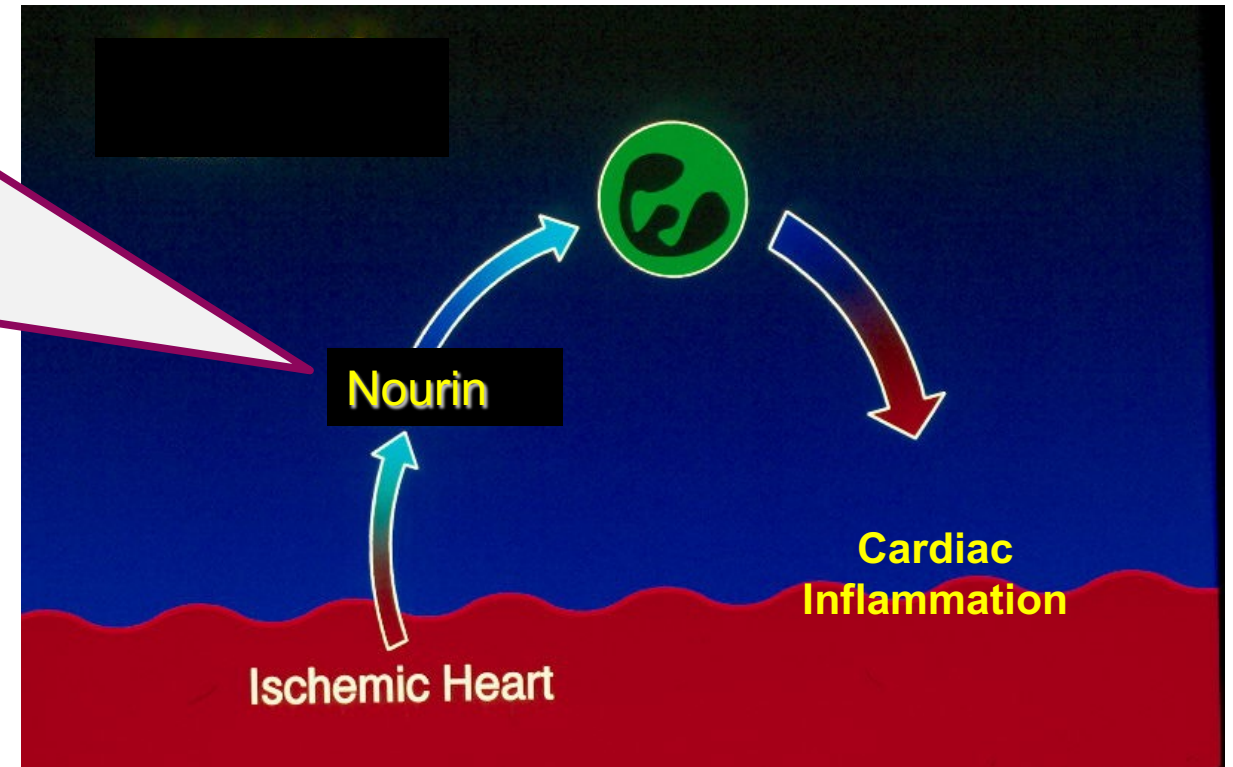
Although high-sensitivity troponin is able to detect myocardial necrosis, there is a need for blood biomarkers that:

- Can identify acute myocardial ischemia in patients, prior to necrosis
- Can aid in the rapid exclusion of ACS patients
- Differentiate CAD patients with ischemia, from non-ischemic patients

Novel Ischemia/Inflammation Biomarkers of Myocardial Ischemia

Two microRNAs Regulate Nourin:

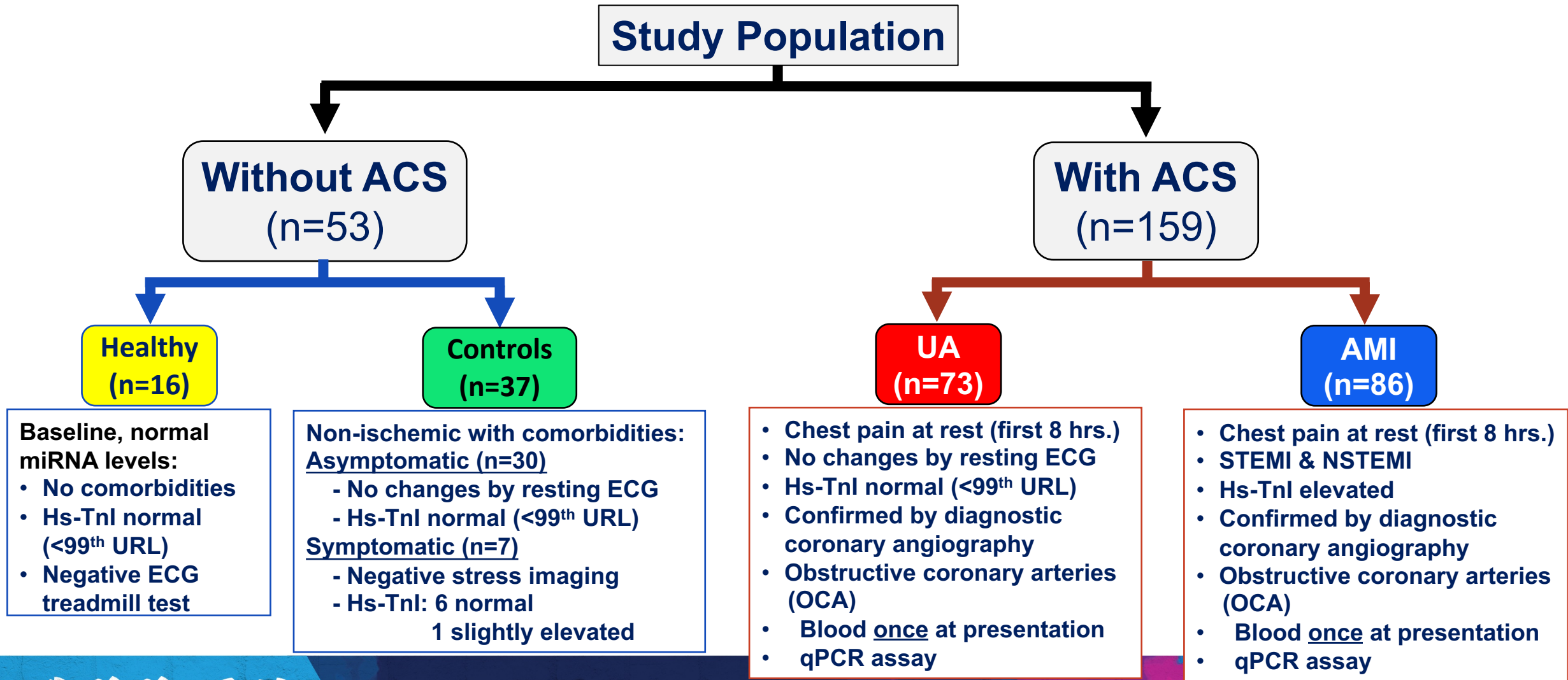
- Myocardial ischemia-induced **miR-137** (a marker of ischemia)
- Inflammation-induced **miR-106b** (a marker of inflammation)



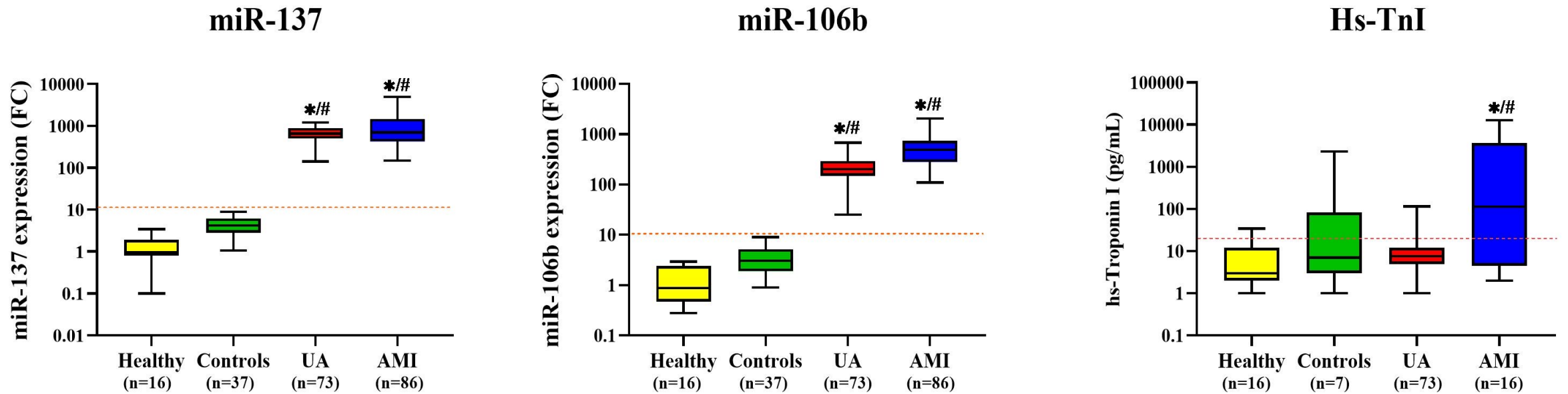
Rationale for Using miRNAs as Biomarkers

- Sensitive, specific, and stable molecular regulators used in other diseases (cancer & infection)
- MiRNAs have not been used as ACS biomarkers, until now
- Expression is tissue- and disease-specific
 - miR-137 **upregulated** in acute cardiac ischemia
 - miR-137 **downregulated** in acute cerebral ischemia and breast cancer
- Rapidly expressed and released after an ischemia event
- Can potentially identify ACS patients, earlier than necrosis markers

Clinical Validation: Expression Levels of miR-137 & miR-106b in ACS Patients and Non-ischemic Controls with Comorbidities



MiR-137 & miR-106b are Highly Expressed in ACS Patients (n=159), but not in Non-ischemic Controls with Comorbidities (n=37)



FC: Fold Change

*: P<0.001 compared to healthy

#: P<0.001 compared to controls

High Diagnostic Sensitivity & Specificity of miR-137 & miR-106b in ACS Patients (n=159) vs. Non-ischemic Controls with Comorbidities (n=37)

Variable	Cut-off Value (*FC)	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
miR-137 (ACS vs. Controls)	>10	100%	100%	100%	100%
miR-106b (ACS vs. Controls)	>10	100%	100%	100%	100%

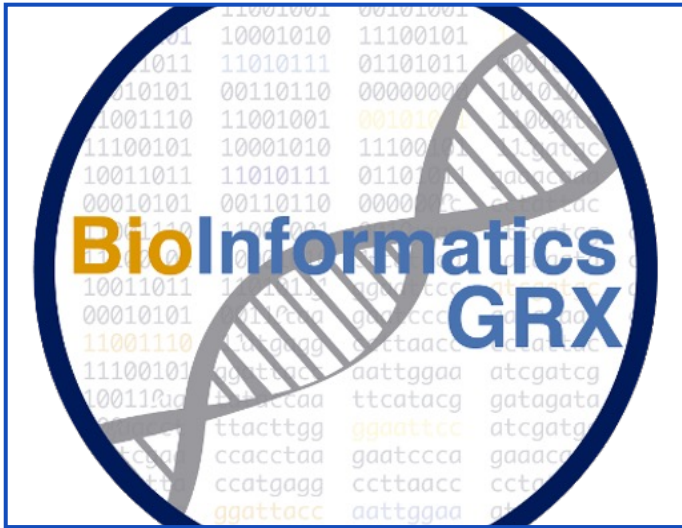
*FC: Fold Change

Number of Non-ischemic Control Patients with Comorbidities, **without** Elevation of miR-137 & miR-106b Expression Levels

Chronic Diseases	Chest Pain (n=7)	Non-chest Pain (n=30)
Diabetes (n)	5	10
Hypertension (n)	4	7
Dyslipidemia (n)	3	24
Renal Disease (n)	1	5
Hepatic Disease (n)	Not recorded	5
Cigarette Smokers (n)	2	19

Despite of significant risk factors in the non-ischemic control patients (n=37), there was **no elevation** in miR-137 & miR-106b expression levels

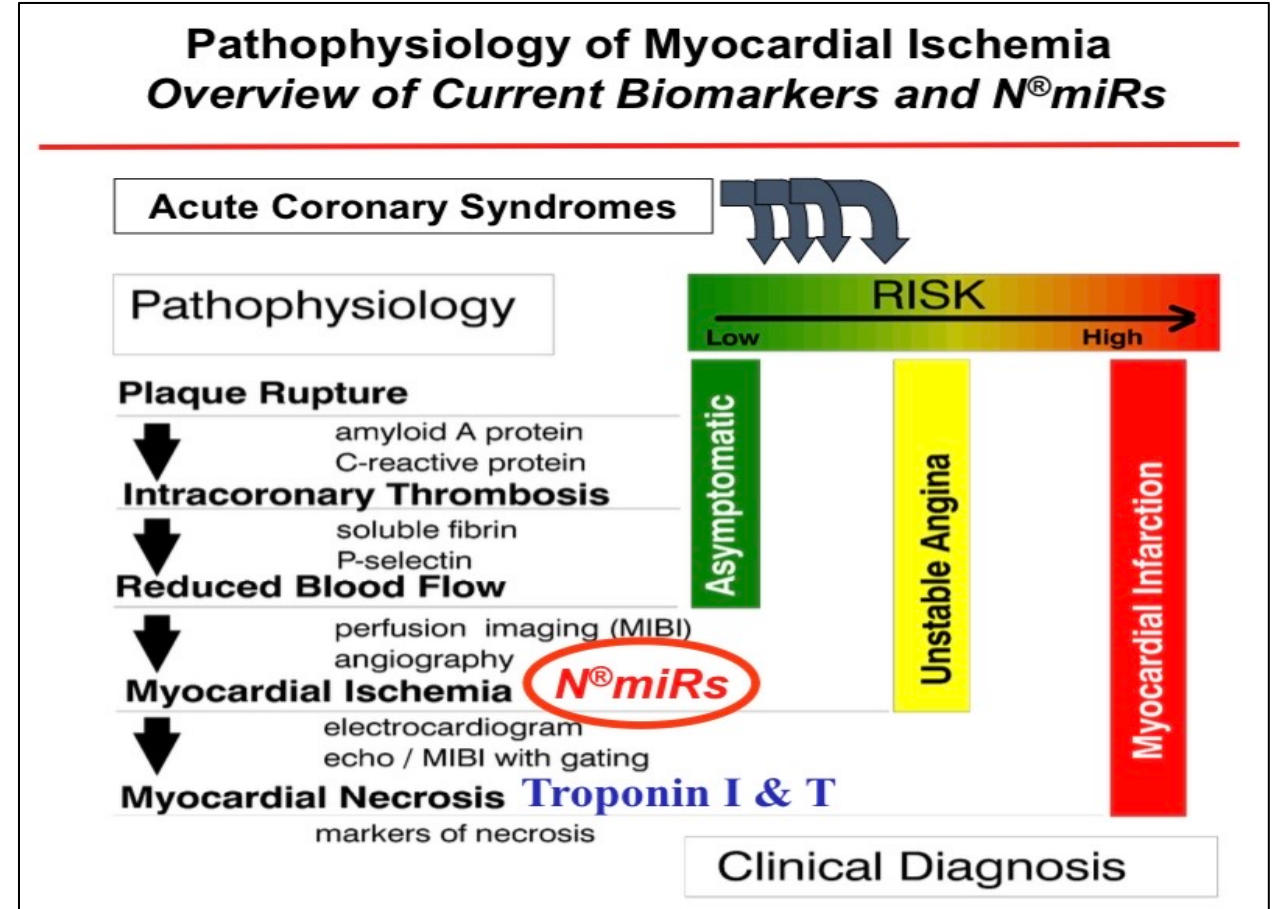
MiR-137 is ACS-Specific Regulator



- MiR-137 & miR-106b are **associated** with ACS pathology
- Myocardial ischemia-induced **miR-137** is **ACS-specific** regulator
- Inflammation-induced **miR-106** is not **ACS-specific** regulator

Conclusions

- MiR-137 & miR-106b regulators **associated** with ACS pathology
 - Identify acute myocardial ischemia in patients, prior to necrosis (troponin)
- MiR-137 is ACS-specific regulator with high diagnostic sensitivity and specificity
 - Differentiate CAD patients with ischemia, from non-ischemic patients
 - Aid in the rapid exclusion of ACS patients



Thank You!

References for Nourin-dependent miR-137 & miR-106b (2019-2024)

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