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MicroRNA-126 predicts postoperative hyperglycemia

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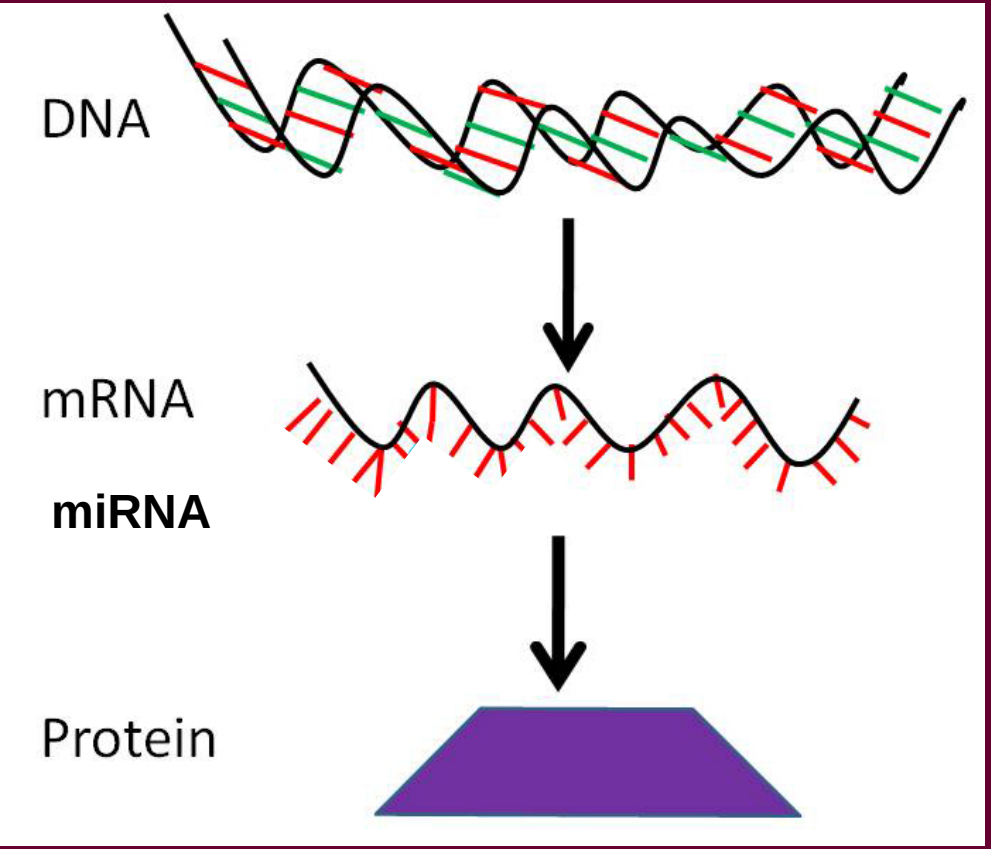
Disclosure of interest

The study was conducted in collaboration with the Diabetes and Metabolism Clinical Research Center of Excellence, Clinical Research Institute at Rambam (CRIR), Haifa, Israel.

What are microRNA's?

- Short non-coding RNA's ~22 nucleotides in length.
- Function: regulation of gene expression by targeting mRNA.



Estimated number of microRNA's genes:

Chimpanzee >400

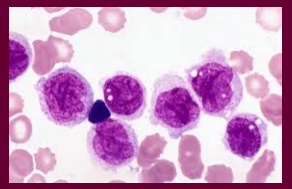
C . Elegans >300

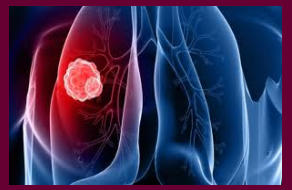
Human >1500

Preoperative plasma microRNA -126 predicts postoperative hyperglycemia

Micro RNA's deregulation in human disease:

Alzheimer's disease
Breast cancer
Burkitt lymphoma
Cardiac hypertrophy
Cardiomyopathy
Cervical cancer
Lung Cancer
Polycystic Kidney Disease
Psoriasic arthritis
Ulcerative colitis





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Micro RNA - 126

- Highly expressed in vascular endothelial cells (Fish *et al*, 2008; Wang *et al*, 2008).
- Stable in blood samples (Zampetaki *et al, 2010).*
- Low microRNA-126 levels were found to correlate with:
  - Current diagnosis of diabetes
  - Onset of future diabetes
  - Diabetic vascular complications

  (Zampetaki *et al, 2010*).

Micro RNA - 126

- There are a few reports concerning microRNA-126 and coronary artery disease (CAD):
  - Circulating levels of microRNA-126 decreased during transcoronary passage in patients with evidence of myocardial injury (De Rosa *et al, 2010).*
  - Relatively low levels of microRNA-126 were found in patients with stable angina (Fichtlscherer *et al, 2010)* and acute MI (Long *et al*, 2012).
  - MicroRNA-126 was not significantly down-regulated or up-regulated in angiographically significant CAD patients (Sun *et al*, 2012).

Preoperative plasma microRNA -126 predicts postoperative hyperglycemia

- Objectives
  - Identify plasma microRNA-126 expression patterns in patients undergoing open heart surgery.
  - Investigate whether plasma microRNA-126 expression levels correlate with dysglycemia and adverse outcomes.

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- Methods
  - Informed consent
  - Prospective data collection
  - Preoperative blood tests

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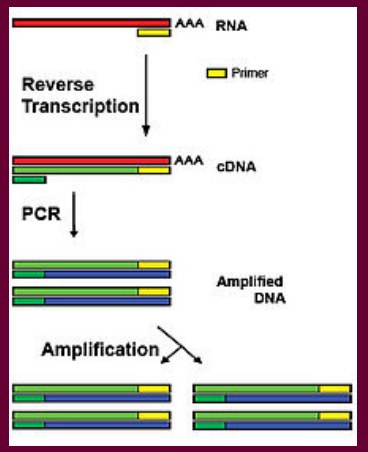
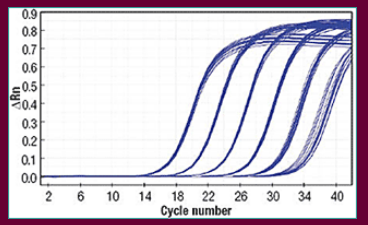
Preoperative plasma microRNA -126 predicts postoperative hyperglycemia

- Methods
  - RNA extraction from patients plasma
    - cel-miRNA-39 as a spike-in control.
  - Reverse transcription
  - Quantitative polymerase chain reaction
  - Data analysis





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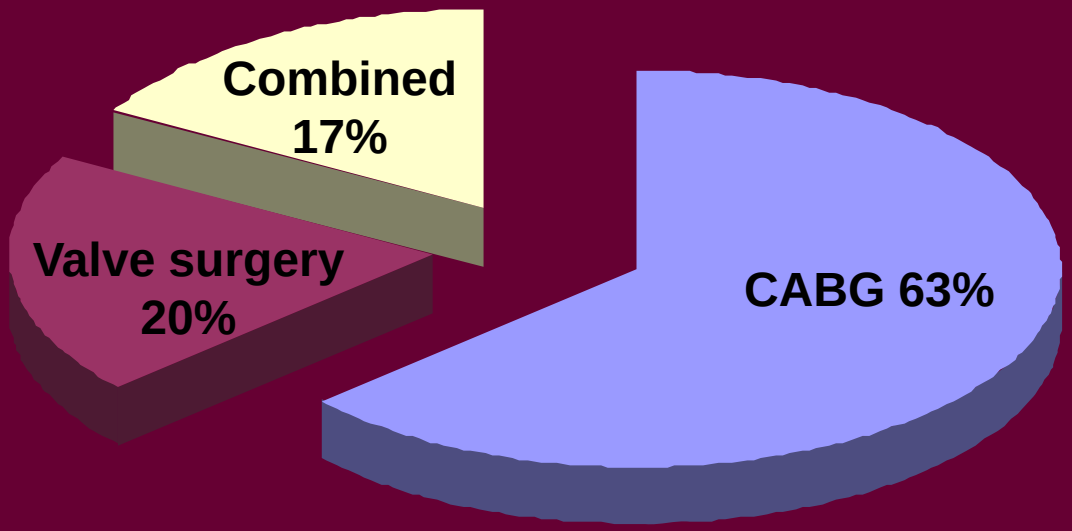
- Results

  – 71 patients enrolled.

  – Division according to surgical procedure:



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Preoperative plasma microRNA -126 predicts postoperative hyperglycemia

Table 1. Patient's characteristics

Variable		Number (%)	Relative miRNA-126 expression level Median (95% CI)	p - value
Sex	**Male**	58 (81.7)	1.26 (0.84-1.67)	
	Female	13 (18.3)	1.40 (0.86-1.94)	P>0.05
Age (years)	**Mean (SD)**	63.4 (10.0)		
	Range	42-87		
	> mean	37 (52)	1.57 (0.70-2.44)	
	< mean	34 (48)	1.19 (0.86-1.52)	P>0.05

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Variable		Number (%)	Relative miRNA-126 expression level Median (95% CI)	p - value
Hb A1C (%)	Mean (SD)	6.9(1.8)		
	Range	4.8-15		
	> 5.7	56 (78.9)	1.52 (0.96-2.08)	
	<=5.7	15 (21.1)	0.83 (0.53-1.12)	*P<0.05*
Diagnosis on admission	Unstable angina	29 (40.8)	1.57 (0.83-2.30)	
	Other	42 (59.2)	1.09 (0.80-1.38)	P>0.05

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Variable		Number (%)	Relative miRNA-126 expression level Median (95% CI)	p - value
Syntax Score	**Mean (SD)**	22.5 (16.7)		
	Range	0-51		
	> mean	36 (57.1)	1.53 (0.7-2.36)	
	< mean	27 (42.9)	1.39 (0.95-1.83)	P>0.05
STS Score (%)	**Mean (SD)**	11.35 (7.23)		
	Range	4.37-35.99		
	> mean	20 (31.2)	1.52 (0.85-2.19)	
	< mean	44 (68.8)	1.27 (0.65-1.89)	P>0.05

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Figure 1. Relation between microRNA-126 and insulin infusion rates in the ICU

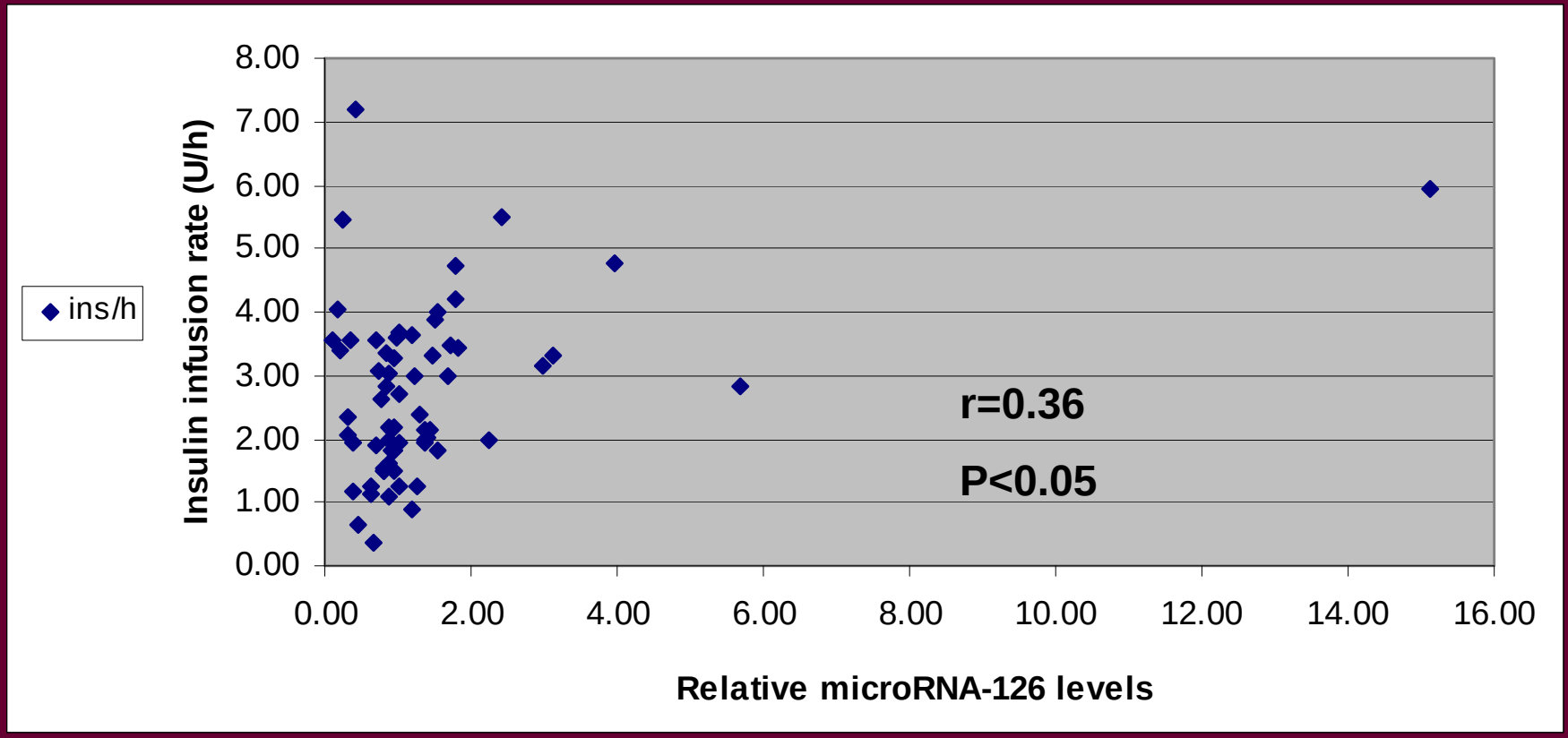

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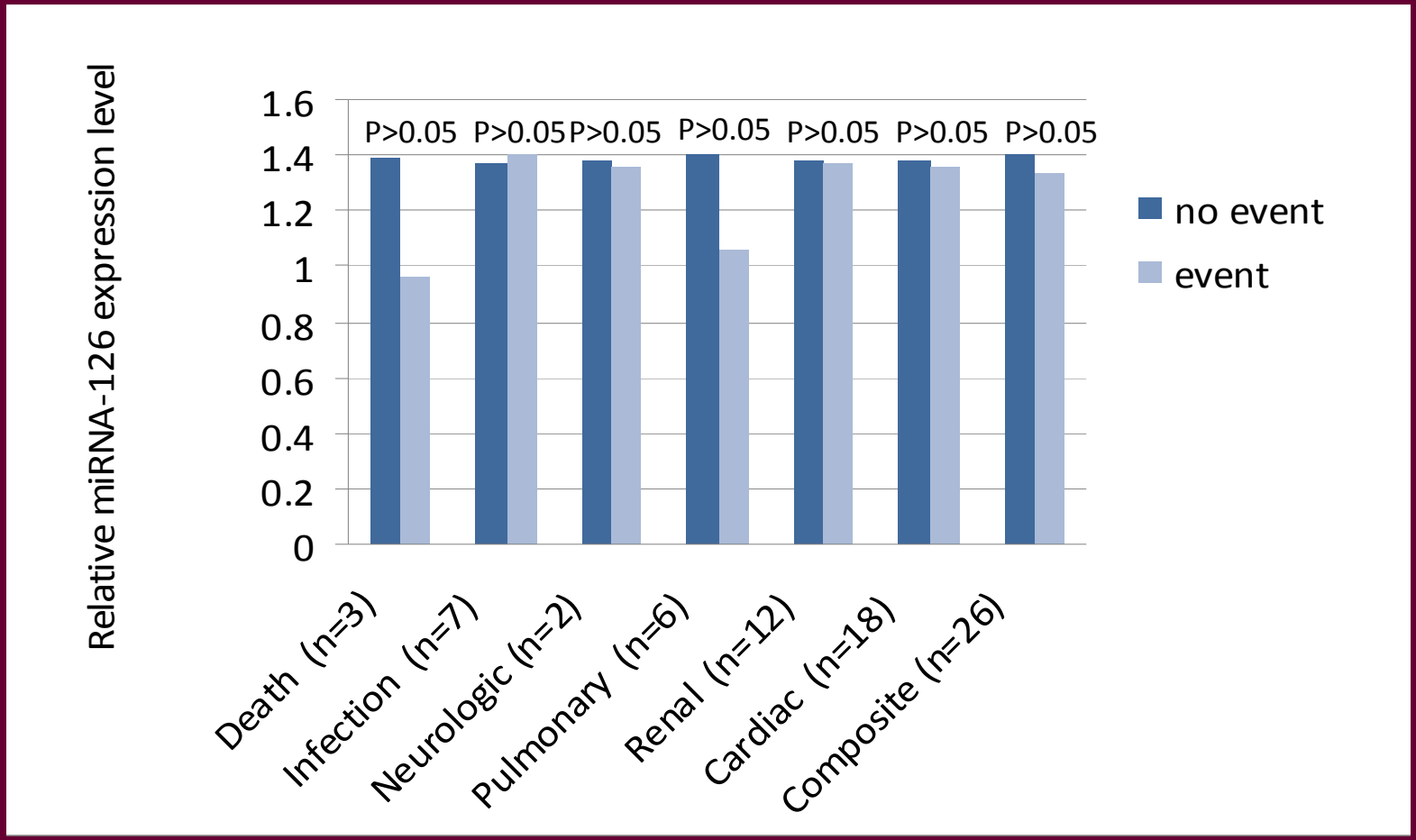
Figure 2. Postoperative outcomes



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- Discussion

Strengths	Weaknesses
Mir-126 stable in blood	Small sample size
Unique population	Normalization methods
Correlation to perioperative glycemic control	
Normalization methods	

THANK YOU

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