

# Novel Treatment for Microvessel Rarefaction

RENAL TRANSPLANTATION, VASCULAR DISEASES

CRCHUM  
CENTRE DE RECHERCHE

1 Provisional patent  
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TRL 3

[Pre-]clinical stage  
*In vivo validation in ischemia-reperfusion models*

**Business Opportunity:**  
Licensing and Co-development

**Market Opportunity:**  
Global market: \$883M USD (2028) for miRNA  
CAGR: 5.9% for miRNA

## TIMELINE

Timeline					
DIAGNOSTIC		IN VIVO VALIDATION		THERAPEUTIC	
miRNA signature confirmed on post-transplant patient samples	Correlation between renal function and miRNA expression levels ongoing	miRNA signature validation on larger cohort (including samples from healthy donors)	In vivo proof-of-concept validation on ischemia-reperfusion and leg ischemia models completed	Reduced microvessel rarefaction and prevention of renal fibrosis 21 days following ischemia-reperfusion (completed)	Identification of downstream targets and validation of MOA ongoing

## THE PROBLEM

During major surgery, sepsis, trauma, or kidney transplantation, interruption of renal blood flow followed by kidney reperfusion (ischemia-reperfusion) causes tubular injury and endothelial cell damage that leads to renal dysfunction, acute kidney injury and to chronic or progressive renal failure.

An estimated 35.5 million Americans have kidney disease and about 815 000 Americans are living with kidney failure (1 in 7). Similarly, blockage in the blood flow of the lower limbs, associated with smoking, diabetes, high blood pressure, aging, injury, or hereditary factors, causes a slowing of blood flow to the legs and feet that can cause pain and fatigue and even lead to ulcers, gangrene, and amputations. It is estimated that nearly 200 million people suffer from peripheral vascular disease worldwide, including nearly 45 million Americans.

Since no biomarkers exist to measure capillary reserve, it would be necessary to identify new markers to predict microvessel rarefaction and renal failure in order to quickly identify and initiate appropriate treatments.

## OUR SOLUTION

**Dr. Marie-Josée Hébert's team has identified specific miRNAs that could be used as diagnostic and therapeutic agents in the context of microvessel rarefaction.**

They have shown that serum measurements of these miRNA markers by PCR predict renal microvessel rarefaction and, thus, the risk of progressive renal failure in humans. Moreover, they have also shown that the administration of these miRNAs in mice prevents renal microvessel rarefaction and accelerates new vessel formation after renal ischemia-reperfusion and leg ischemia.

## MARKET

**Market application:**

- Diagnostic
- Microvessel rarefaction
- Renal transplantation
- Peripheral vascular diseases

It is estimated that the market for miRNAs as a research tool, **diagnostic tool, and therapeutic agent** could reach nearly \$US 883M by 2028 with a CAGR of 5.9% for the period 2023-2028.

The annual cost for actual treatments can range from 56K \$CA to 107K \$CA per patient for dialysis and it is estimated that nearly 200 million people suffer from peripheral vascular disease worldwide.

Market sizes for major therapeutic indications, such as renal insufficiency and peripheral vascular diseases, range from \$3.6 Billion USD (CAGR 8.2% 2029) to \$9.2 Billion USD (CAGR 8.35% 2031), respectively.

## TEAM

Marie-Josée Hebert  
CRCHUM, Lead PI

Francis Migneault  
CRCHUM

Héloïse Cardinal  
CRCHUM

Alain Rivard  
CRCHUM

Hyunyun Kim  
CRCHUM