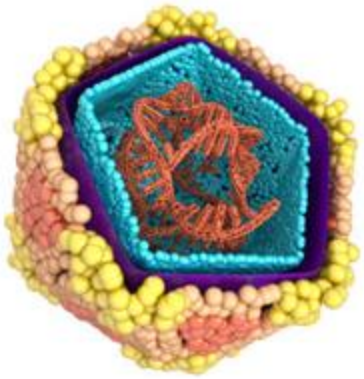
miRNA Biomarker and Drug Target Platform for Coxsackievirus-Linked Type 1 Diabetes

A new strategy to detect and disrupt early drivers of T1D

Background:

Type 1 diabetes (T1D) is a lifelong autoimmune disease in which the body's immune system destroys insulin-producing cells in the pancreas, leading to dependence on daily insulin therapy. Coxsackievirus infection has been identified as a trigger for T1D onset in genetically susceptible individuals—uncovering a novel and actionable pathway for intervention.

Despite this insight, there are no approved antiviral treatments to prevent or delay T1D. This represents a major unmet clinical need and a strategic entry point for **innovative antiviral technologies aimed at preserving beta-cell function**. Targeting coxsackievirus represents a promising and differentiated approach in a market with high unmet need, growing incidence, and significant healthcare burden. With over 9 million people living with T1D worldwide and a global market projected to exceed $25B by 2030, the commercial potential of such approaches is substantial.



Depiction of Coxsackie Virus
Source:
https://www.istockphoto.com/photo/coxsackie-virus-internal-structure-gm.com

Technology:

MicroRNAs (miRNAs) are powerful regulators of gene expression with emerging roles in viral pathogenesis and autoimmunity. Researchers at Albany Medical College have identified a novel human miRNA—hsa-miR-AMC1—that is induced in the human pancreatic beta cells following infection with coxsackievirus B4 (CVB4), a virus strongly linked to triggering T1D typically in genetically predisposed individuals.

Importantly, an antisense oligonucleotide (antagomir) designed to inhibit hsa-miR-AMC1 effectively blocks CVB4 infection in preclinical models, suggesting a novel and targeted antiviral strategy to delay or prevent the onset of T1D. This approach offers the possibility of cell- and context-specific intervention, potentially avoiding the side effects of broader immunosuppressive therapies.

In addition to its therapeutic potential, hsa-miR-AMC1 may serve as a diagnostic biomarker for early CVB4 infection, enabling timely intervention before irreversible loss of pancreatic cells occurs. This dual application—therapeutic and diagnostic—positions the technology for strong clinical and commercial impact in a field urgently seeking more precise, preventive strategies against autoimmune type 1 diabetes.

Techology Readiness

Available for licensing or sponsored research

Intellectual Property

PCT Filed April 2025

Advantages:

- Antagomir targeting hsa-miR-AMC1 could reduce persistent infection by CVB4 that may lead to T1D
- hsa-miR-AMC1 may be a novel biomarker for infection by CVB4 strain of coxsackievirus

Applications:

- Anti-viral therapeutic strategy for CVB4-induced T1D
- Diagnostic marker of CVB4 infection

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