

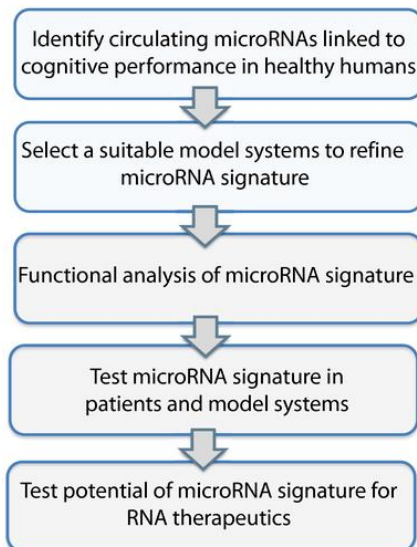


# microRNA Signature Indicates Risk for Cognitive Decline

Alzheimer, biomarker, cognitive impairment, microRNA, RNA therapeutics

## INVENTION NOVELTY

A 3-microRNA signature was established as a novel biomarker to identify the risk for cognitive decline. Expression of the 3-microRNA signature has been found to increase even before onset of cognitive decline can be observed in behavioral changes. Therefore, individuals carrying the risk to develop mild cognitive impairment (MCI) or Alzheimer's disease (AD) can be identified in a timely manner to undergo further diagnostics and early and effective intervention, if necessary. In addition, targeting the 3-microRNAs signature using anti-miRs was able to treat neuronal dysfunctions.



*Experimental approach to identify circulating microRNAs that allow early detection of patients at risk for developing cognitive decline. Source: Islam, Md Rezaul et al. EMBO molecular medicine, e13659. 11 Oct. 2021*

## VALUE PROPOSITION

Today, diagnosing Alzheimer's disease (AD) is laborious process involving cognitive and laboratory testing, usually at an advanced stage of molecular pathology, a time point when causative treatments fail. Therefore, minimal invasive and inexpensive biomarkers to identify individuals at risk for cognitive decline well before clinical manifestation are highly needed. The novel biomarker consisting of a circulating 3-microRNA signature meets these needs as it reflects key processes linked to neural homeostasis and informs about cognitive status. Advantageously, the expression level of the 3-microRNA signature can be determined from blood samples. This approach is suitable to develop a point-of-care or even home-based test that would allow minimal invasive and low-cost screening that informs about molecular processes related to the cognitive reserve. Furthermore, targeting all 3-microRNAs using anti-miRs was shown to ameliorate cognitive decline in AD mice.

## TECHNOLOGY DESCRIPTION

The 3-microRNA signature consists of miR-146a-5p, miR-148a-3p and miR-181a-5p. It serves as a prognostic tool to identify individuals at risk for cognitive decline. In addition, anti-miRs targeting all 3-microRNAs represent a suitable therapeutic option to affect cognitive decline.

## COMMERCIAL OPPORTUNITY

The technology is available for licensing and co-development.

## DEVELOPMENT STATUS

The prognostic as well as the therapeutic potential were shown in *in vivo* studies in mice. In addition, the predictive power of the biomarker was shown in studies in human individuals and patients using blood samples.

## PATENT SITUATION

European patent application was filed in December 2020. Regional / national Phases in EP und US based on PCT-application were initiated in June 2023.

## FURTHER READING

Islam, Md Rezaul et al. "A microRNA signature that correlates with cognition and is a target against cognitive decline." *EMBO molecular medicine*, e13659. 11 Oct. 2021, [doi:10.15252/emmm.202013659](https://doi.org/10.15252/emmm.202013659)

