Dementia and Technology

A Human-Based Platform to Support the Development of Interventions for Healthy Cognitive Ageing
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Purpose Cognitive decline and dementia are major contributors to loss of independence, reduced quality of life, and increased care needs in older adults. While a wide range of therapeutic and technology-enabled interventions are being developed to address these challenges, many show limited success when translated into clinical practice or real-world care settings. One contributing factor is the lack of human-relevant technologies that can predict how individuals with different genetic risk backgrounds may differ in amyloid-related burden and responsiveness to intervention. This study describes a human-based evaluation platform that functions as an enabling research technology to support the assessment, prioritisation, and targeting of interventions aimed at pathways relevant to cognitive ageing and dementia risk. **Method** A human-derived neural platform representing distinct genetic backgrounds associated with increased vulnerability to age-related cognitive decline was used as a predictive evaluation system. Changes in amyloid-β–related burden were assessed under baseline conditions and following an RNA-based intervention. Outcome measures focused on differences in protein aggregation and the function of cellular clearance and stress-response pathways, selected for their relevance to intervention evaluation and stratification across genetic risk groups [1,2]. **Results and Discussion** The platform identified genetic background–dependent differences in amyloid-β–related burden and responsiveness to intervention, indicating its potential to predict variation in disease-associated processes relevant to cognitive ageing. These findings suggest that human-based evaluation technologies can provide useful information at early stages of intervention development, particularly for identifying which risk groups may benefit most from specific strategies. In the context of gerontechnology, such predictive platforms may complement device-, digital-, and care-oriented innovations by informing intervention design, supporting targeted approaches, and contributing to strategies aimed at maintaining cognitive function, autonomy, and quality of life in later life while reducing long-term care burden.

References

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