The potential of pathological protein fragmentation in blood-based biomarker development for dementia - with emphasis on Alzheimer's disease - DTU Orbit (29/01/2019)

The potential of pathological protein fragmentation in blood-based biomarker development for dementia - with emphasis on Alzheimer's disease

The diagnosis of dementia is challenging and early stages are rarely detected limiting the possibilities for early intervention. Another challenge is the overlap in the clinical features across the different dementia types leading to difficulties in the differential diagnosis. Identifying biomarkers that can detect the pre-dementia stage and allow differential diagnosis could provide an opportunity for timely and optimal intervention strategies. Also, such biomarkers could help in selection and inclusion of the right patients in clinical trials of both Alzheimer's disease and other dementia treatment candidates. The cerebrospinal fluid (CSF) has been the most investigated source of biomarkers and several candidate proteins have been identified. However, looking solely at protein levels is too simplistic to provide enough detailed information to differentiate between dementias, as there is a significant crossover between the proteins involved in the different types of dementia. Additionally, CSF sampling makes these biomarkers challenging for presymptomatic identification. We need to focus on disease-specific protein fragmentation to find a fragment pattern unique for each separate dementia type - a form of protein fragmentology. Targeting protein fragments generated by disease-specific combinations of proteins and proteases opposed to detecting the intact protein could reduce the overlap between diagnostic groups as the extent of processing as well as which proteins and proteases constitute the major hallmark of each dementia type differ. In addition, the fragments could be detectable in blood as they may be able to cross the blood-brain barrier due to their smaller size. In this review, the potential of the fragment-based biomarker discovery for dementia diagnosis and prognosis is discussed, especially highlighting how the knowledge from CSF protein biomarkers can be used to guide blood-based biomarker development.

General information
State: Published
Organisations: Department of Systems Biology, Nordic Bioscience A/S
Contributors: Inekci, D., Svendsen Jonesco, D., Kennard, S., Karsdal, M. A., Henriksen, K.
Number of pages: 14
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Frontiers in Neurology
Volume: 6
ISSN (Print): 1664-2295
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
Scopus rating (2017): CiteScore 3.28 SJR 1.402 SNIP 1.124
Web of Science (2017): Impact factor 3.508
Web of Science (2017): Indexed yes
Scopus rating (2016): CiteScore 3.29 SJR 1.56 SNIP 1.082
Web of Science (2016): Impact factor 3.552
Scopus rating (2015): CiteScore 3.07 SJR 1.31 SNIP 1.016
Web of Science (2015): Impact factor 3.184
Web of Science (2015): Indexed yes
Scopus rating (2014): CiteScore 2.78 SJR 1.166 SNIP 1.026
Scopus rating (2013): CiteScore 2.34 SJR 0.962 SNIP 0.75
Scopus rating (2012): CiteScore 1.54 SJR 0.461 SNIP 0.698
Scopus rating (2011): SJR 0.207 SNIP 0.463
Original language: English
Keywords: Dementia, Alzheimer's Disease, Biomarkers, Blood, Post-translational Modifications
Electronic versions:
fneur_06_00090.pdf
DOIs:
10.3389/fneur.2015.00090
Research output: Research - peer-review : Review – Annual report year: 2015