Early differences in islets from prediabetic NOD mice: combined microarray and proteomic analysis - DTU Orbit (30/08/2017)

Early differences in islets from prediabetic NOD mice: combined microarray and proteomic analysis

Type 1 diabetes is an endocrine disease where a long preclinical phase, characterised by immune cell infiltration in the islets of Langerhans, precedes elevated blood glucose levels and disease onset. Although several studies have investigated the role of the immune system in this process of insulitis, the importance of the beta cells themselves in the initiation of type 1 diabetes is less well understood. The aim of this study was to investigate intrinsic differences present in the islets from diabetes-prone NOD mice before the onset of insulitis. The islet transcriptome and proteome of 2-3-week-old mice was investigated by microarray and 2-dimensional difference gel electrophoresis (2D-DIGE), respectively. Subsequent analyses using sophisticated pathway analysis and ranking of differentially expressed genes and proteins based on their relevance in type 1 diabetes were performed. In the preinsulitic period, alterations in general pathways related to metabolism and cell communication were already present. Additionally, our analyses pointed to an important role for post-translational modifications (PTMs), especially citrullination by PAD2 and protein misfolding due to low expression levels of protein disulphide isomerases (PDIA3, 4 and 6), as causative mechanisms that induce beta cell stress and potential auto-antigen generation. We conclude that the pancreatic islets, irrespective of immune differences, may contribute to the initiation of the autoimmune process. All microarray data are available in the ArrayExpress database (www.ebi.ac.uk/arrayexpress) under accession number E-MTAB-5264.

General information
State: Published
Organisations: Department of Bio and Health Informatics, Integrative Systems Biology, KU Leuven, Ghent University
Authors: Crèvecoeur, I. (Ekstern), Gudmundsdottir, V. (Intern), Vig, S. (Ekstern), Marques Câmara Sodré, F. (Ekstern), D'Hertog, W. (Ekstern), Fierro, A. C. (Ekstern), Van Lommel, L. (Ekstern), Gysemans, C. (Ekstern), Marchal, K. (Ekstern), Waelkens, E. (Ekstern), Schuit, F. (Ekstern), Brunak, S. (Intern), Overbergh, L. (Ekstern), Mathieu, C. (Ekstern)
Number of pages: 15
Pages: 475-489
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Diabetologia
Volume: 60
Issue number: 3
ISSN (Print): 0012-186X
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 5.23 SJR 3.158 SNIP 1.732
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 3.609 SNIP 1.923 CiteScore 5.57
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 3.215 SNIP 1.97 CiteScore 5.57
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 3.216 SNIP 2.029 CiteScore 6
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 3.144 SNIP 1.916 CiteScore 5.76
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 3.068 SNIP 1.87 CiteScore 5.47
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 3.182 SNIP 1.828
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.948 SNIP 1.643
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 3.198 SNIP 1.859
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.761 SNIP 1.611
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 2.641 SNIP 1.444
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.271 SNIP 1.579
Scopus rating (2004): SJR 2.415 SNIP 1.882
Scopus rating (2003): SJR 1.959 SNIP 1.82
Scopus rating (2002): SJR 1.935 SNIP 1.747
Scopus rating (2001): SJR 2.245 SNIP 1.782
Scopus rating (2000): SJR 2.015 SNIP 1.524
Scopus rating (1999): SJR 2.026 SNIP 1.619
Original language: English
2D-DIGE, Beta cells, Intrinsic differences, Microarray, NOD mice, Pathway analysis, Post-translational modifications, Type 1 diabetes
DOIs:
10.1007/s00125-016-4191-1
Source: FindIt
Source-ID: 2351033115
Publication: Research - peer-review › Journal article – Annual report year: 2017