Transcriptomics–genomics data integration and expression quantitative trait loci analyses in oocyte donors and embryo recipients for improving in vitro production of dairy cattle embryos - DTU Orbit (31/03/2019)

In this paper we first provide a brief review of main results from our previously published studies on genomewide gene expression (transcriptomics) in donor and recipient cattle used in in vitro production (IVP) of embryos and embryo transfer (ET). Then, we present novel results from applying integrative systems genomics and biological analyses where transcriptomics data are combined with genomic data in both donor and recipient cattle to map expression quantitative trait loci (eQTLs). The eQTLs are genetic markers that can regulate or control the expression of genes in the entire genome, via complex molecular mechanisms, and thus can act as a powerful tool for genomic and gene-assisted selection. We identified significant eQTLs potentially controlling the expression of 13 candidate genes for donor cow quality (IVP parameters; e.g. cyclin B1 (CCNB1), outer dense fiber of sperm tails 2 like (ODF2L)) and 19 candidate genes for recipient cows quality (endometrial receptivity; e.g. ER membrane protein complex subunit 9 (EMC9), mannosidase beta (MANBA), peptidase inhibitor 16 (PI16)). Annotation and colocation of detected eQTLs show that some of the eQTLs are in the same genomic regions previously reported as QTLs for reproduction-related traits. However, eQTLs and the candidate genes identified should be further validated in larger populations before implementation as genetic markers or used in genomic selection for improving IVP and ET performance.

General information
State: Published
Organisations: Statistics and Data Analysis, Department of Applied Mathematics and Computer Science , Department of Health Technology
Contributors: Kadarmideen, H., Mazzoni, G.
Pages: 55–67
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Reproduction, Fertility and Development
Volume: 31
ISSN (Print): 1031-3613
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.75 SJR 0.681 SNIP 0.766
Web of Science (2017): Impact factor 2.105
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.88 SJR 0.788 SNIP 0.895
Web of Science (2016): Impact factor 2.656
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.9 SJR 0.852 SNIP 0.96
Web of Science (2015): Impact factor 2.135
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.45 SJR 1.054 SNIP 1.101
Web of Science (2014): Impact factor 2.4
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.04 SJR 0.917 SNIP 0.961
Web of Science (2013): Impact factor 2.577
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.27 SJR 0.916 SNIP 1.032
Web of Science (2012): Impact factor 2.583
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.9 SJR 0.845 SNIP 0.833