

Transcription dynamics in a developing organism

Nanopore long reads enable full-length cDNA sequencing, allowing both quantitative and qualitative analysis of gene expression, and detailed characterisation of novel transcripts.



Anthony Bayega and his team investigated gene expression in the olive fly embryo at different developmental stages using nanopore long reads

Impact

These data enabled an in-depth characterisation of transcriptional mechanisms involved in olive fly embryo development. Insights into the gene expression signatures of sex determination can be used to identify potential targets for sex-specific genetic control of this agricultural pest.

Results

A four-fold increase in transcriptome diversity was achieved, compared to current NCBI predictions, providing a rich resource of novel genes and isoforms for future downstream investigations.

98%

read alignment to the olive fly genome

>50%

of expressed genes sequenced in full-length single reads

DSK

gene involved in sex determination had a sex-specific isoform structure

3,553

of the 11,883 genes identified were novel

79,810

transcript isoforms characterised

HOW?

Full-length cDNA was synthesised from olive fly embryos in hourly intervals over the first 6 hours of development. cDNA sequencing was performed on the MinION™, followed by *de novo* transcriptome assembly.

Kit Oxford Nanopore PCR-cDNA Sequencing Kit
Available here: store.nanoporetech.com/cdna-pcr-sequencing-kit.html

Device MinION

Tools Custom analysis pipeline, including:
– Canu (error correction)
– GMAP (alignment)
– CupcakeToFU (assembly)
– SQANTI and PRAPI (assembly evaluation)

Find out more about analysis pipelines available here: community.nanoporetech.com/knowledge/bioinformatics

Find out more at: nanoporetech.com/applications/rna-sequencing

Publication

A. Bayega et al. Transcriptome landscape of the developing olive fruit fly embryo delineated by Oxford Nanopore long-read RNA-Seq. BioRxiv (2018). DOI: <http://dx.doi.org/10.1101/478172>

Webinar

A. Bayega. Transcriptome landscape of the developing a olive fruit fly embryo delineated by Oxford Nanopore long-read RNA-Seq. Available at: <https://nanoporetech.com/resource-centre/anthony-bayega-transcriptome-landscape-developing-olive-fruit-fly-embryo-delineated> [Accessed 15 January 2019]



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