Pocket-sized genomics and transcriptomics analyses: a look at the newborn BioVRPi project

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INTRODUCTION

BioVRPi

Our project has started in January 2021 and focuses on RPi usage in bioinformatics

Raspberry Pi (RPi)

RPi is a small single board low-cost computer developed by the Raspberry Pi Foundation

Goals

BioVRPi aims to offer a low cost, stable and tested bioinformatic environment to students and researchers involved in genomics and transcriptomics

RESULTS

Genomics

GWAS on *Homo sapiens*

395 samples - 1047171 markers

Devices (64-bit)

RPi model 4 - 8 GB RAM - 1.5 GHz

Tower PC - 32 GB RAM - 3.0 GHz

Phases	RPi	PC
Pre-processing	1 min	3 sec
QC	2 min	4 sec
Association	5 min	1 min

Transcriptomics

RNA-seq on *Strongyloides stercoralis*

8 samples - 38.9 M reads/sample on avg

Devices (64-bit)

RPi model 4 - 2 GB RAM - 1.5 GHz

Laptop - 16 GB RAM - 3.2 GHz

Phases	RPi	Laptop
Alignment	60 min	30 min
Reconstruct	25 min	28 min
Expression	41 min	7 min

CONCLUSION

RPis are effective devices for reproducible GWAS and RNA-seq analyses

Availability of state-of-art programs with ARM-based customization

Possibility to develop an having-fun environment, to learn and explore new strategies