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Type	Oral communication
Session	Bioinformatics challenges in the SARS-Cov-2/COVID-19 pandemic
Title	SAveRUNNER: an R-based tool for drug repurposing and its application to SARS-CoV-2 infection
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Motivation

Currently, no proven effective drugs for the novel coronavirus disease COVID-19 exist, and despite widespread vaccination campaigns, we are far short from herd immunity. The number of people who are still vulnerable to the virus is too high to hamper new outbreaks, leading to a compelling need of finding new therapeutic options devoted to combating SARS-CoV-2 infection. Drug repurposing represents an effective drug discovery strategy from existing drugs that could shorten the time and reduce the cost compared to de novo drug discovery.

Methods

We developed a novel network-based tool for drug repurposing called SAveRUNNER (Searching off-lAbel dRUg aNd NEtwoRk) [1,2] with the aim to offer a promising framework to efficiently detect putative novel indications for currently marketed drugs against diseases of interest. SAveRUNNER predicts drug-disease associations by quantifying the interplay between the drug targets and the disease-associated proteins in the human interactome through the computation of a novel network-based similarity measure, which prioritizes associations between drugs and diseases located in the same network neighborhoods.

Results

SAveRUNNER was successfully applied to predict off-label drugs to be repositioned against the new human coronavirus (2019-nCoV/SARS-CoV-2), and it achieved high accuracy in the identification of well-known drug indications, thus revealing itself as a powerful tool to rapidly detect potential novel medical indications for various drugs that are worthy of further investigation. SAveRUNNER has been developed in R and its source code is freely available at https://github.com/sportingCode/SAveRUNNER.git, along with a comprehensive user guide.

Info

References

[1] Fiscon, G., Paci, P. SAveRUNNER: an R-based tool for drug repurposing. BMC Bioinformatics 22, 150 (2021). https://doi.org/10.1186/s12859-021-04076-w

[2] Fiscon G, Conte F, Farina L, Paci P. SAveRUNNER: A network-based algorithm for drug repurposing and its application to COVID-19. PLoS Comput Biol. 2021 Feb 5;17(2):e1008686. doi: 10.1371/journal.pcbi.1008686. PMID: 33544720; PMCID: PMC7891752.

Figure

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Availability	https://github.com/sportingCode/SAveRUNNER.git

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