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Big data in livestock genomics can feed new concepts in One Health

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Epidemiological, biological and virological characteristics of many viruses, including their potential ability to cross species barriers and become zoonoses, suggest that livestock species living close to humans should be considered as part of a global control in a renewed One Health concept. In this context, it is important to comprehensively evaluate if animals could represent risk factors for human health (and vice versa) considering their genetic susceptibility to the diseases and their potential role as reservoir of infecting agents. Here, we mined more than 30 TB of DNA sequences from 1471 animals, including cattle, pigs, rabbits, and avian species to mine these datasets from these two perspectives: (i) evaluation of the variability in genes that are directly involved in the progress of the host infections from viruses; (ii) to obtain a first global landscape unconventional picture of the animal virome contained in these datasets. Genomics data were from publicly available resources and derived from several breeds/populations and different sequencing projects around the world. Variants from the host genome datasets were compared with those present in humans to infer susceptibility/resistance to virus infections. The results can help to design genetic conservation strategies of animal genetic resources. Moreover, the virome characterization from these whole-genome sequencing datasets from the host livestock species can help to evaluate viruses that silently circulate helping the establishment of a risk evaluation system. Overall, the possibility to rapidly obtain, store and process genomics data as in the AnGen1H project, led to discover new elements to consider as potential risk factors to be included in One Health perspectives.

Any relevant links

Results of the study are available at:
https://www.sciencedirect.com/science/article/pii/S088875432200057X?via%3Dihub
https://www.mdpi.com/2076-2615/12/7/838
https://www.nature.com/articles/s41598-021-82956-0

Topic

EOSC Compute Platform

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