Introduction to the Special Issue on COVID-19

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As of 27 August 2020, Coronavirus Disease 2019 (COVID-19) continues to spread worldwide. The epidemic has exceeded 200 countries and regions and endangers the entire global population. As of the time of writing, the number of worldwide infections has already breached 24.33 million and continues to grow at a frantic rate, and the world's death reached 829.6 thousand. The world, having been caught unprepared by this invisible enemy, has responded the best way that it could. However, this unprecedented catastrophy has shocked the global village on a level equal to that of the world war and the big economic depression.

Given that the COVID-19 outbreak was first detected in China, Chinese have experienced earlier COVID-19 sequences and earlier testing of treatments and earlier deployment of the ICU. In addition, traditional Chinese medicine has the unique advantage of complementary modern medicine in wider fighting fields. We, as some scholars in different fields full of conscience and responsibility, are willing to contribute their own strength to the control and research COVID-19.

The authors propose a new analytical tool - the Meta-genomic Analysis System (MAS). This is based on the organization of bioinformatics on the genetic properties of k-mers. The MAS provides multiple measurements from local measures to global characteristics for SARS-CoV-2 genomes of full sequences to be described by powerful transformations from number counting to quantum thermodynamic potentials under multiple entropy functions. Multiple variables of probability distributions and their quantitative measurements are explored for categories, classifications, clustering and similarity comparisons on multiple levels of hierarchy for internal modules and structures.

The first paper of this issue briefly describes the architecture of the MAS and key modules in the system. The following 20 papers provide assistant descriptions to show each special function via sample results associated with various transformations in typical cases of applications to support the metagenomic analysis system. Special functions are included as follows: 1D similarity comparison, 1D seq 2D similarity maps, protein coding and probability spectra, multiple distributions under k-mer conditions, 2D histogram in 3D maps, momentum distributions, multiple combinatorial probability distributions, integrated transformation, clustering transformation and multiple entropies with multiple levels of hierarchy. Typical sequences of SARS-CoV-2, Bats, Pangolins, MERS, Ebola, SARS and other coronavirus sequences are processed as samples in relevant papers to show flexible and powerful capacities to handle genomic sequences. This set of results provides sample applications to benefit medicine, neurology, brain sciences and others from micro-ensembles to macro-ground objects to perform analysis in wider applications to enhance human health activities in the future.

A genomic index based on an entropy function can effectively map a whole sequence of SARS-CoV-2 cases to a unique index to be a certain position on a genomic index map. This is the first time a thousand coronavirus sequences have been mapped directly into a restricted geometric area with maximal properties from a thermodynamic viewpoint. Refined classifications and accurate clustering properties can be further explored.

Based on some basic theories, we may obtain that the propagation of COVID-19 is a typical nonlinear process with chaos. A key of controlling COVID-19 prevents propagation from reaching an irreversible chaos point. Further, we derive three basic origins of disease, and corresponding therapeutic methods may be applied to COVID-19. Moreover, antiviral research on Tibetan Medicine Triphala is reviewed. Traditional Chinese medicine has achieved good results in fighting against COVID-19 and prompts researchers to explore the evidence of traditional medicine to inhibit viruses from a broader point of view and provide more possible ways for the treatment of COVID-19.

We will be certain to overcome the epidemic, and all mankind will meet a new dawn!

P.S. Handbook of COVID-19 Prevention and Treatment: https://covid-19.alibabacloud.com/zh

1. Handbook English version: https://www.alibabacloud.com/zh/universal-service/pdf_reader?pdf=Handbook_of_COVID_19_Prevention_en_Mobile.pdf

2. Handbook Chinese version: https://www.alibabacloud.com/zh/universal-service/pdf_reader?pdf=Handbook_of_COVID_19_Prevention_zh_Moblie.pdf

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