A STUDY ON SOME STRUCTURAL FEATURES RESPONSIBLE FOR SARS-COV-2 INFECTION

FATALITY

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ABSTRACT :

In this article Covid19 is structurally analysed to establish the pathogenic attack through its spike protein (1) The most of the bio -macromolecules starting from globular proteins to viruses with a high molecular weight average showing polymeric nature as to induce their biological activities. The tremendous infectivity mainly depends on one most important hydrodynamic properties like Zigzag nature of viral walk (2) for a specific molecular weight (M). Hydrodynamic s nature of mRNA – viruses like SARS-COV-2 is analysed to compute the random– zigzag motion (2,3) of the virus known as Radius of Gyration(R_g) value of virus . For computation of R_g a standard curve(4)of $R_g - M$ is statistically analysed with best fit regression analysis like Morgan – Morgan – Finney (**MMF**) (5) model . This zigzag – random walk (2) of SARS-COV-2 molecule computed from R_g value may be considered as fatality rate of infection (6).

Keywords : SARS-COV-2 , , Biopolymers , MMF Regression , Hydrodynamic Properties .

INTRODUCTION :

Covid19 a m-RNA virus having a outer sphere of capsule consists of spike protein (SP) nucleocapsid as well as non-protein (NP) part responsible for viral pathogenic attack . The Molecular Weights of the recombinant proteins as determined by elution chromatography (SDS – PAGE) are determined as 180 kDa, 110 kDa and 35 kDa for the corresponding subunits by **Tingting Li et al (7)** . Main **objective** of this study is to correlate the hydrodynamic virological properties like radius of gyration (R_g)(8,9) of Covid19 macro-molecule with infectivity through MMF-regression (5,10) statistics.

Figure – I (8, 9)

METHODS (4, 5, 6) :

1. Software used – Curve Finder 1.4 with Excel spread-sheet (Office ,2007)
2. Data Availability (4) – A [2x2]square matrix of M (KDa) – Rg (nm) in the following set of standard data-set (4) of different biopolymers ranging as bellow :
[10 ,1.5] [20,2] [50,2.5] [100,3.5] [200,4.5] [500,6] , [1000,8.5] .
3. Excel – Spreadsheet (Office 2007) Distribution of M-Rg of above dataset .

Figure – II (Scattered data plot)

Figure - III(Bar –Chart)

RESULTS AND DISCUSSION [5, 6, 10, 11]

The above set of [2x2] data -matrix is executed by Curve Finder 1.4 through MMF regression fit with Chi-Sq variation , Cov –Matrix [4x 4], Pearson (r) coefficient , Standard error (s) to represent best fit model equation as following results .

Figure – IV

Figure – V

Where variables (y) and (x) are Radius of Gyration (Rg) and Molecular weight (M) and a,b,c,d are coefficients of regression respectively . (Figure –IV)

Figure (III) is statistically relevant with a Pearson – correlation (r) coefficient = 0.9978 , standard error (s) = 0.2342 follows the criteria for goodness of fit ($p\text{-value} < 0.0001 @ 0.01 \text{ interval}$)(11,12).Figure – III also represents standard calibration curve (**Figure – IV**) for variation of R_g vs Molecular weight of biopolymers of proteins and virus molecule . . For SARS-COV-2 molecular weights of the subunits (7) 180KDa ,110KDa ,35 KDa the value of R_g as computed from Figure –IV are **3.9 nm ,2.95 ,and 0.7 nm (8)** respectively .

CONCLUSION :

The random nature (2) of nucleocapsid protein (7) can be specified by by the computation(13) of R_g values (Figure –III) $3.9 +_2.95 +_0.7 \text{ nm}$ indicates a Zigzag travelling path at a specific direction of SARS-COV-2 mutated (14) infections . This type of gyrated structural features of the virus may be considered as speed of fatality (1,6) of infections.

CONFLICT OF INTEREST : I shall declare that I have no conflict of interest / competing interest .

REFERENCES :

1.JAYDIP DATTA . Mortality Rate Due to Pulmonary Fibrosis Associated with Sars-Cov-2 Infection: Scope of Best Fit Regression, 29 December 2020, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-137219/v1].

2.. DATTA, JAYDIP (2021): RANDOM COIL STATISTICS: : A VECTOR MODEL. figshare. Preprint.
https://doi.org/10.6084/m9.figshare.13599881.v1https://www.researchgate.net/publication/338633266_RANDOM_COIL_STATISTICS_A_VECTOR_MODEL?_sg=a--x7RsPabt0EQwllKP4EtCicOCcUUVZEcZdGnVcnq98yxb1SmeO2Y_gziWL2ASB8cKZp-Gq3GbtNePKT1tUvJIP0j-Fsu5j6yoYsLyz.m9uBQxIYdoUe7Ln1bpDMpxhViEg4BLaO9v9dII3wDAXlVqPHsnPmDIy_HHTVVolR9zKxonOmipcdjs_Kt5YunGA)

3. DATTA, JAYDIP (2020): HYDRODYNAMIC MODELLING OF BIOPOLYMERS : A CORRELATION APPRAOCH. figshare. Journal contribution.
[https://doi.org/10.6084/m9.figshare.12167607.v1 \(https://www.researchgate.net/publication/330713349_HYDRODYNAMIC_MODELLING_OF_BIOPOLYMERS_A_CORRELATION_APPRAOCH_ISSN_0020-3254?_sg=2jbuLATLGZ-fGF6n7_E8fTVqdHk-5jN-xkNasq14nw9-IB3mAmKNrqoLSwrlTEsH0b_AwpSrbVVWHcOQyGixl6Z-gFWOBhH286otRY5.SqiUcpclRflaYOR_K0tS_Gr9SaekiuHjRmHTmvH2M55J91g2kehJIVOJHvsPqwf_bEvOvH0nvE5zX4ePsNUoIQ\)](https://doi.org/10.6084/m9.figshare.12167607.v1(https://www.researchgate.net/publication/330713349_HYDRODYNAMIC_MODELLING_OF_BIOPOLYMERS_A_CORRELATION_APPRAOCH_ISSN_0020-3254?_sg=2jbuLATLGZ-fGF6n7_E8fTVqdHk-5jN-xkNasq14nw9-IB3mAmKNrqoLSwrlTEsH0b_AwpSrbVVWHcOQyGixl6Z-gFWOBhH286otRY5.SqiUcpclRflaYOR_K0tS_Gr9SaekiuHjRmHTmvH2M55J91g2kehJIVOJHvsPqwf_bEvOvH0nvE5zX4ePsNUoIQ)))

4. JAYDIP DATTA. (2021). <https://zenodo.org/record/4453206> ,(Version Version 1.0) [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.4453206>

5. **JAYDIP DATTA . Growth of D614G Virus : Morgan – Morgan – Finney (MMF) Regression , 15 October 2020, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-92776/v1].**

6. **JAYDIP DATTA . COVID19 - A Correlation Study of Infection Fatality Rate vs Age, 20 October 2020, PREPRINT (Version 2) available at Research Square , [https://doi.org/10.21203/rs.3.rs-85482/v2] .**

7. **Tingting Li et al ,Characterization of the SARS-CoV-2 Spike in an Early Prefusion Conformation-
<https://doi.org/10.1101/2020.03.16.994152> ,(line No .116-118) .**

8. [https://www.researchgate.net/post/What do we think about Bo-Physical properties of Covid19](https://www.researchgate.net/post/What_do_we_think_about_Bo-Physical_properties_of_Covid19) , Jaydip Datta , RG , 08.2020 .

9. [https://www.researchgate.net/post/Whether Chemistry Pharmacy are interdisciplinary-acedemics research-updated to pandemic Covid19](https://www.researchgate.net/post/Whether_Chemistry_Pharmacy_are_interdisciplinary-acedemics_research-updated_to_pandemic_Covid19) - Jaydip Datta , RG , 2020 .

10. **Jaydip Datta. Mathematical and Statistical Study on COVID19- SIR Model, 12 October 2020, PREPRINT (Version 2) available at Research Square [https://doi.org/10.21203/rs.3.rs-89766/v2]**

- 11.[https://www.researchgate.net/post/Whether Statistics Teaching Should be Necessary in Academics Research Industry Real life Experiance](https://www.researchgate.net/post/Whether_Statistics_Teaching_Should_be_Necessary_in_Academics_Research_Industry_Real_life_Experiance) - Jaydip Datta , RG , 2020 .

- 12..[https://www.researchgate.net/post/What is Co-Variance Matrix-Explain its Utility](https://www.researchgate.net/post/What_is_Co-Variance_Matrix-Explain_its_Utility) - Jaydip Datta , RG , 2020 .

13.
[https://www.researchgate.net/post/What are the BASIC mathematical methods specially used in COMPUTATIONAL CHEMISTRY including COMPUTATIONAL BIOLOGY](https://www.researchgate.net/post/What_are_the_BASIC_mathematical_methods_specially_used_in_COMPUTATIONAL_CHEMISTRY_including_COMPUTATIONAL_BIOLOGY) - Jaydip Datta , RG , 2020 .

- 14..
[https://www.researchgate.net/post/Let us Discuss something about Reproducible research technique including COVID 19](https://www.researchgate.net/post/Let_us_Discuss_something_about_Reproducible_research_technique_including_COVID_19) - Jaydip Datta , RG ,2020 .