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A mathematical analysis of the dynamics of prion proliferation

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ABSTRACT

How do the normal prion protein (PrP^C)and infectious prion protein (PrP^{Sc}) populations interact in an infected host? To answer this question, we analyze the behavior of these two populations by studying a system of differential equations. We prove that with parameter input consistent with experimentally determined values, we obtain the persistence of PrP^{Sc}. We also prove local stability results for the disease steady states, and a global stability result for the disease free steady state. Finally, we give numerical simulations, which are confirmed by experimental data.

Key Words: Prion diseases; Mathematical model; Global Stability; System of differential equations; Persistence of solution

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