

1077-92-2494

**Georgiy P Karev\*** (karev@ncbi.nlm.nih.gov), National Institutes of Health, Bldg. 38A, Rm, 8600 Rockville Pike, Bethesda, MD 20894. *On non-exponential models of prebiological evolution.*

E.Szathmary and M.Smith (1997) represent the model of prebiological evolution by the equation for the concentration of molecules  $\frac{dx}{dt} = kx^p$  (SMS model). Well established examples of non-exponential growth give global demography ( $p = 2$ ) and some molecular replicator systems ( $p = \frac{1}{2}$ ). It is not always clear why non-exponential growth is observed in reality. We show that SMS model can be understood within the frameworks of inhomogeneous population models. *Theorem.* 1) Any SMS equation describes the total size of inhomogeneous frequency-dependent model  $\frac{dl(t,a)}{dt} = \frac{k al(t,a)}{N(t)} = kaP(t,a)$  with Gamma-distributed parameter  $a$  at the initial moment ; 2) Additionally, any hyper-exponential equation with  $p > 1$  describes the total population size of inhomogeneous density-dependent model  $\frac{dl(t,a)}{dt} = kal(t,a)$  with Gamma-distributed parameter  $a$  at the initial moment; The results can be extended to the model of a community composed of non-exponential populations and (partly) to Lifsons' theory (1999) of prebiological evolution, which deals with competitions of replicators for extrinsic resources. (Received September 22, 2011)