Comparative Study of Entropy and Information Change in Closed and Open Thermodynamic Systems

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In this analysis we discuss the entropy and information aspects of closed and open thermodynamic systems. The information and entropy change of the system during processes of synthesis and decomposition are discussed in the context of RNA synthesis. The analysis suggests that during synthesis reactions in a closed thermodynamic system, its information content increases while its entropy decreases. In degradation reactions occurring in closed systems information decreases while entropy increases. In open thermodynamic systems performing synthesis reactions both entropy and information content increase. Entropy of an open thermodynamic system increases because of flux and accumulation of particles. Entropy increase is partly reduced by reactions of synthesis and self-assembly processes. In open systems performing decomposition processes both entropy and information content decrease. Entropy of an RNA molecule decreases during loss of nucleotides, because nucleotides leave the open system taking the entropy with them.