



## Protein Structure and Functions: Creation of New Protein Functions

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### Message from the Guest Editor

Diverse organisms inhabit on the present Earth using versatile proteins exhibiting various functions. However, only a quite tiny portion of the extraordinarily large amino acid sequence space ( $\sim 10^{130}$ ) has been used in extant organisms. Inversely stating this, it means that an immensely vast amino acid sequence space remains unused and, therefore, protein has a large potential ability hidden to generate new functions still now. On the other hand, it is important to understand how entirely new proteins were and have been generated during evolution to efficiently use the ability. In connection with this, I have proposed GC-NSF(a) hypothesis assuming that entirely new proteins are created from a nonstop frame on antisense strand of a GC-rich gene under a protein 0th-order structure. I believe that it would become possible to generate a number of artificial proteins with new functions through the application of the knowledge to new protein technologies. I hope that many researchers will participate in and contribute to development of a novel protein engineering.

