

Many cases of proteins with multiple functions are now known. The extra function has almost always come as a surprise and was discovered serendipitously. The true extent of multiple functionalities is unknown and would be of great interest to evaluate. Proteins consist of many atoms and have complex movements of time spans of a μ -second to a second, so theoretically it would be possible pack many actions into one protein. To exemplify, describing the action of 1 protein could entail the positions of 10^4 atoms and to describe its motion in 1 μ -second would need 10^9 time steps, in total 10^{13} coordinates. Its function might be summarized by one action (such as hydrolyzing 1 bond) in this time period. However, designed machines are different from evolved machines and these numbers also illustrate that there could be room for several functions, possibly many.

Moonlighting proteins are clearly understudied and could be extremely important in the biology of an organism.