

Popular Scientific Summary:

Disorder and Environmental Chaos

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Some of the most important scientific research is based on understanding, manipulating and improving of proteins. The human body is composed of 62 % water, 16 % proteins and 22% fats, carbohydrates, metals etc... Therefore it is very important to understand what proteins look like, what they are doing, and how and why they are doing it. Proteins come in many shapes and sizes, but recently, some proteins have been found to have no shape in particular (intrinsically disordered proteins), and 44% of all human proteins have disordered regions. Not much work has been done on intrinsically disordered proteins, but recently it has been uncovered that they are actually very common and numerous in cells and they have been found to play extremely important roles.

This study was conducted to find out how these intrinsically disordered proteins interact with the environment around them, and compare this with folded proteins. This would help understand why unfolded proteins are not only common, but why disorder can be a desirable characteristic. To do this, the stability of the interaction between MDM2-p53 (folded-unfolded) and NCBD-p53 (unfolded-unfolded) when changing the salt concentration was studied.

Unfortunately the results were not fully clear. It was found that MDM2-p53 was not significantly affected by the change in salt concentration. For NCBD-p53 on the other hand no accurate melting temperature could be determined and the experiment should be repeated. From the data it seems that salt concentration did not affect the interaction of NCBD with p53 significantly.

By concluding that salt concentration does not affect intrinsically disordered proteins, as much, or more than folded proteins, the question of how disordered proteins are affected by the environment has not been answered. Although the experiment needs repeating, it should also be repeated with other folded and intrinsically disordered proteins. It is also important to change other environmental factors such as pH.

Unravelling the mystery of intrinsically disordered proteins can lead to many new discoveries and applications. One important application is the development of new drugs. By understanding how intrinsically disordered proteins interact with the environment, drugs which can target them can be produced. The drugs may also be intrinsically disordered proteins and therefore it must be understood how they would interact inside and outside of the cell.