Community Matters

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The research story

Understanding biochemical networks is a focus of modern biological sciences. These networks describe how proteins interact with other proteins and with genes, how genes are expressed, and how biological information is processed. There can be thousands of proteins involved. One way to analyze these complex networks is to divide them into "protein communities". Like communities in human societies, these communities contain members that interact closely with each other. And like communities in human societies, the members often have a shared activity. For example, members of a hockey club all play hockey. So we expect that by identifying protein communities we can gain understanding of the functions the proteins are involved in. These communities of proteins exist at multiple scales in a network, with smaller communities often forming parts of larger ones.

The image

In the image we classify proteins into protein communities at varying resolutions. On the very left each protein forms its own community, which is indicated in black. As we increase the community size, we get the colored bands that expand from left to right. At the right end of the figure we end up with one dominating community in blue, which includes all the proteins in the network. Having chosen to color the proteins that stand alone black, we create a pleasing effect that highlights the colorful protein communities.

Reference

[1] Lewis ACF, Jones NS, Porter MA, Deane CM, The function of communities in protein interaction networks at multiple scales, BMC Systems Biology 4: 100, 2010.