Researchers show heparan sulfate adjusts functions of growth factor proteins

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When the human genome project produced a map of human genes, the number of genes in humans turned out to be relatively small, approximately the same number as in primitive nematode worms. The difference in complexity between human and primitive organisms results from the ways in which the functions of genes are elaborated, rather from just the number of genes. Boston University School of Medicine (BUSM) researchers are showing how heparan sulfate, a carbohydrate that is expressed on the surface of all human cells, adjusts the functions of growth factor proteins. These findings currently appear on-line in the *Journal of Biological Chemistry*.

Each cell responds to signals in the form of growth factor proteins that bind to cell surfaces. "The heparan sulfate on each cell helps the growth factor proteins connect with a growth factor receptor that is necessary for the signaling to occur," explained Joseph Zaia, PhD, an associate professor of Biochemistry at BUSM. Cells can change the way they respond to growth factors by altering the structure of the heparan sulfate on their surfaces.

Under the direction of Zaia, researchers from BUSM's department of Biochemistry have produced a new picture of the structure of the heparan sulfate and how it interacts with growth factor proteins. These new results demonstrate that growth factors home into regions of the heparan sulfate chains known as non-reducing ends. "Such binding of growth factors to the non-reducing ends of heparan sulfate chains may be a general means whereby normal cell growth is maintained.

Conversely, a breakdown in such signaling may contribute to abnormal cell growth," he added.

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