Discovered: A cluster of 60 proteins that help cells move and feel

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University of Manchester scientists have discovered a cluster of 60 proteins that allow the body's cells to react to their environment and communicate with each other.

Professor Martin Humphries, who led the research team said: "Our findings on how cells sense their environment have unlocked an important key to understanding how we can persuade cells to form different tissues and how we might stop cell movement in diseases such as cancer."

The research is published in *Nature Cell Biology*.

Cells react differently to materials that are hard or soft, rigid or elastic. For example, stem cells on a hard surface develop into bone cells, while the same cells on a very soft surface make nerve cells.

Similarly, cells, including tumour cells, tend to move more rapidly on hard surfaces compared to soft surfaces. The ways in which cells sense this difference in their environment remains a mystery.

The research revolves around integrins -– a family of proteins that were discovered in the 1980s and are essential for cell growth and function.

Integrins, which are a building block of complex life, are found at the outer edge of cells and encourage proteins to assemble around them when they interact with the outside environment.

The team carried out complex experiments to understand the workings of the integrin protein clusters using mass spectrometry, and assembled a list of all the proteins in the system.

One member of the team, Dr Adam Byron, assembled similar data from across the world and distilled it into a list of 60 proteins that cluster around integrins.

Another member of the research team, Ed Horton, said: "After assimilating all the complex data which was available, we were surprised that only 60 proteins were the essential mediators of the information exchange between integrins and the outside world.

"So there is now a consensus view: integrins work closely with at least 60 proteins to coordinate many functions including cancer cell migration."

And fellow researcher Dr Jon Humphries said: "Understanding how cells sense their environment is an important step in understanding how, for example, cancer cells move or how stem cells take on different jobs."

More information: Edward R. Horton et al. Definition of a consensus integrin adhesome and its dynamics during adhesion complex assembly and disassembly, *Nature Cell Biology* (2015). DOI: 10.1038/ncb3257

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