Ub-Ligase â€” The Engine of Electrical Transmissions in

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In a paper in the journal Molecular Cell, Yongyun Jin and colleagues have identified the protein that plays a key role in regulating transmission of electrical signals throughout the nervous system. This protein, E3 ubiquitin ligase, is required for transmission of electrical signals from one cellâ€™s nucleus to the cell surface where transistors are tuned into the movement of electrons. As electronic signals can travel long distances, the protein is a critical element of molecular electronic circuits that are used in modern computers and robots.

The assembly of electrical signals begins in the nucleus and travels to another part of the cell where transistors are attached. Electrons from one cell quickly carry electrical signals to the transistors, which translate them into pulses of different frequencies that are then transmitted through the cell.

The study conducted by the University of Hong Kong highlights the central role of ubiquitin ligase, another member of the ubiquitin family, in this process. Ubiquitin ligase is the first ubiquitin protein to have undergone study within the cell. Prior studies of ubiquitin proteins have been limited to the tissue culture and it was unknown exactly how ubiquitin ligase worked in the living organism.

The researchers in Hong Kong were interested in the ultimate structure of ubiquitin ligase because the ubiquitin family play a prominent role in the process of biological information transfer. Modern signals are altered when sequentially translated into different frequencies, such as DNA barcoding for humans or the band of radio waves that correspond to a certain frequency of traffic. Knowing exactly what shape of Ub-Ligaseâ€™s structure influences electrical transmission could potentially help researchers design synthetic electronic circuits that can be made to conform to the properties of the signal that they want to carry.

The protein is named Ub-Ligase because it binds to histone changes and is thus named after the Ub-Ligase molecule that makes it function. Ub-Ligase plays a key role in the first steps of neuronal signaling. In order to achieve the success of these signaling steps, Ub-Ligase binds to the histone complexes that first connect the biological information on chromosomes to the nucleus, thereby creating an â€œinformation road mapâ€ before allowing it to travel to the cell surface to create the transmission signal that extends throughout the entire nervous system.

It is important to distinguish Ub-Ligase from Ub-Ligase (Ub3) or Ub-Ligase (Ub2) because Ub-Ligase, Ub3, and Ub-Ligase (Ub2) are all members of the ubiquitin family and are all three active enzymes. In a somewhat similar way to how Ub-Ligase binds histone complexes to the cytoplasm and then to the nucleus to encode the information on the cytoplasm, Ub-Ligase binds histone complexes to the cytoplasm and the cytoplasm before they bind to the nucleus to encode the information on the cytoplasm. Ub-Ligase binds the histone complexes to the cytoplasm and a number of cascading reactions occur after that and in the cascade of reactions is Ub-Ligase. Most of Ub-Ligaseâ€™s functions are represented by the location of Ub-Ligase on a histone complex in the cytoplasm.

Another crucial role is Ub-Ligaseâ€™s role in the transit of electrical signals through the cell from the nucleus to the cell surface where transistors translate the electrical signals to pulses of different frequencies. Ub-Ligase and Ub-Ligase (Ub2) proteins both participate in this process of transferring electrical signals between the nucleus and the cell surface. However, Ub-Ligase appears to be less active in this transit of electrical signals and Ub-Ligase (Ub3) and Ub-Ligase (Ub2) seem to be more active.

Some research also has shown that Ub-Ligase functions differently when it binds histone complexes to the cytoplasm than when it binds histone complexes to the cytoplasm; when Ib3 binds in the cytoplasm, Ub-Ligase (Ub3) binds in the cytoplasm and Ub-Ligase (Ub2) binds to the histone complexes. This observation demonstrates that Ub-Ligase depends on the different levels of contact that it has with histone complexes in the cytoplasm and in the nucleus.

It is therefore very important to understand how Ub-Ligaseâ€™s transmission of electrical signals changes when it binds to certain histone complexes. This study shows how Ub-Ligase makes

A Yellow Fire Hydrant In The Middle Of A Field