OHSU research reveals how cells 'Dial In', decode AM, FM signals

by Bend Weekly News Sources

New research conducted by the Oregon National Primate Research Center at Oregon Health & Science University reveals how individual cells perceive and decode communication signals, much like a radio tunes in individual radio stations. The research helps explain how intra-cellular communications are received and understood by cells. The findings are to be printed in the FASEB Journal, which is published by the Federation of American Societies for Experimental Biology. The article currently is published online."While the application for this research is quite broad, our study specifically focused on a hormone called GnRH, which is involved in fertility," explained P. Michael Conn, Ph.D., a senior scientist and associate director at ONPRC. "GnRH is sensed by receptors in the brain's pituitary, and the signals change in both magnitude and frequency, much like AM and FM radio signals. The pituitary must decode these signals and respond correctly in order to regulate reproduction. What we didn't understand until now was how the cells were able to sense the information and translate it into an appropriate response. "In reality, the GnRH signal carries several messages at once like a radio transmission. It's not like a light switch that is simply switched on or off, but can give cells multiple instructions at the same time."AM signals carry voice or music that is decoded by a radio based on the magnitude (amplitude) of the radio waves. In comparison, FM waves are decoded based on the frequency of the waves. Conn's research has shown how the structure of the primate GnRH receptor has specialized to receive and decode both AM and FM signals, and even has a built-in "squelch control," to decrease noise, like the control on a walkie-talkie. Nature appears to prefer to transmit complex information by FM signals for the same reason that FM stations are clearer -- it is easier to reduce noise and get a higher-quality signal. As reproduction has become more complex, going from fish and birds, to mammals and eventually primates, the efficiency of the reproductive process has increased. We see the appearance of structural specializations in mammals and primates that do not exist in fish and birds.The researchers believe these findings may help shed light on certain disorders in which the cellular communication system has broken down.