***WDR11*-mediated Hedgehog signaling links congenital hypogonadotropic hypogonadism, Kallmann syndrome and ciliopathy**

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The Hedgehog (Hh) signaling pathway plays a fundamental role in normal development and homeostasis. The primary cilium, a microtubule-based organelle present in most vertebrate cells, is an organizing center for extracellular signals including Hh. *WDR11* is known to be mutated in congenital hypogonadotropic hypogonadism (CHH) and Kallmann syndrome (KS). However, the biological activities of WDR11 are poorly understood. Here we report that WDR11 is a downstream component of the Hh signaling pathway and required for normal ciliogenesis. Disruption of *WDR11* expression in mouse and zebrafish models results in dysgenesis of multiple organs that are affected in CHH/KS and other human ciliopathies, as well as mid-line disorders such as holoprosencephaly, indicating a potential genetic overlap among these disorders. Using mouse and human cell lines, we demonstrate that WDR11 translocates from the nucleus to the cytosol and cilia in response to Hh signaling, and modulates processing of the Hh effector protein GLI3. Loss of WDR11 results in nuclear accumulation of GLI3 repressor, accompanied by attenuation of Hh target gene response. Our study reveals a novel disease mechanism mediated by WDR11 and the Hh signaling pathway, suggesting that CHH/KS could be a part of the spectrum of human ciliopathies.