



**Supplementary Figure 1.** Strategic wiring of  $\beta$ -catenin to other signaling cascades that boosts noise buffering capacity of the protein. Signaling by majority of pathways, e.g. sonic hedgehog (Hh), TGF- $\beta$ , PI3K-Akt, amplify the transcriptional activity of  $\beta$ -catenin (blue lines). On the contrary, stress-related pathways, e.g. notch-1, p53, and gsk3 $\beta$ , reduce the availability of free-cytoplasmic  $\beta$ -catenin (red lines). Wnt signaling is the main amplifier of noise buffering capacity of  $\beta$ -catenin (green lines).