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Protein identified which helps cancer cells to survive stressful conditions

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Researchers at NUI Galway have made a discovery that could lead to the development of more effective treatments for a number of diseases. They have shown that a protein produced when cells are stressed interacts with a stress sensor allowing cells to survive conditions of intense stress. Understanding this interaction may help scientists interfere with cancer cells so the cells can no longer survive exposure to stressful conditions. These findings are published next week in the online, open access journal *PLoS Biology*.

Healthy cells are not usually under stress, but unhealthy cells, such as cancer cells, are often under considerable stress because they grow rapidly in places where they are not supposed to grow. When a cell is under these stressful conditions, the stress protein Hsp70 is activated to help the cell.

Professor Afshin Samali, lead author of the study and head of the Department of Biochemistry at NUI Galway, and his team have discovered that under cell stress conditions Hsp70 interacts with a receptor in the cell, activating survival mechanisms and preventing apoptosis, the normal cell death mechanism. By understanding more about Hsp70 and the way it functions, scientists can learn how to block its function, allowing unhealthy cells to succumb to stress and die. This could have significant implications in the development of new cancer drugs, which would block the protein to encourage tumor cell death. In contrast to diseases where cell death is abundant such as Alzheimer's, Parkinson's Disease, and Diabetes, increasing the levels of Hsp70 could

potentially be used to help these cells survive stressful conditions.

Professor Samali states: "Our results have identified a novel protein-protein interaction that helps cancer cells to survive stressful growth conditions. By interfering with this interaction we hope to develop a new class of anticancer drugs. This work was funded by Science Foundation Ireland and will have a significant impact on cancer research and drug design."

More information: Gupta S, Deepti A, Deegan S, Lisbona F, Hetz C, et al. (2010) HSP72 Protects Cells from ER Stress-induced Apoptosis via Enhancement of IRE1a-XBP1 Signaling through a Physical Interaction. PLoS Biol 8(7): e1000410. doi:10.1371/journal.pbio.1000410