

By ~~Stefania~~ Science Editor

## **The Switch That Leaves a Woman Boobless**

### *Proteins, mRNA and angiogenesis in breast cancer*

Besides its deadly or morbid side, breast cancer is disastrous for a woman's sex-appeal. Now one of the most common worldwide breast cancer types, locally advanced breast cancer (LABC), has been linked by a NYU School of Medicine team to a molecular switch in the protein synthesis. LABC represents over 50 % of breast cancers in developing countries, and 30% of breast cancers among poor categories in the US. This cancer is characterized by a large tumor (over 2 in (5 cm) when first detected), a moment when the cancer may have spread into neighboring lymph nodes and tissues, but not in more remote areas in the body. Over 80 % of LABC patients die in five years following the diagnosis, if not treated. But even treatment cannot do much, as this highly lethal cancer is usually detected late in its evolution. It was known that large tumors require the development of blood supply through new vessels (angiogenesis) for their growth. The tumor's probability of inducing angiogenesis is determined by various genes. The new research published in November 9, 2007 issue of the journal *Molecular Cell* has discovered an unknown second pathway in protein synthesis involved in controlling the decoding of genetic messages (mRNAs) for factors that control angiogenesis and tumors expansion. "Our study shows that an unusual molecular switch occurs in the machinery that carries out synthesis of proteins that are essential for angiogenesis and tumor progression," said lead researcher Dr. Robert J. Schneider. The team detected two molecules largely present ("overexpressed") in LABC. Mice tests revealed that the molecules induced a switch in the use of messenger RNA (which transports the genetic information from nuclear DNA to protein synthesis places, the ribosomes). This switch is triggered when tumors lack oxygen (hypoxia) due to low blood supply, inducing angiogenesis which spurs tumors' growth and development. "The identification of the molecular switch and its importance for development of locally advanced breast cancer reveals realistic targets for the development of new therapeutics to block tumor angiogenesis and progression in breast and possibly other cancers", said Schneider.