[5 Options for Keeping Tumor Cells Alive Longer](http://www.conversantbio.com/blog/5-options-for-keeping-tumor-cells-alive-longer)

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Researchers seeking new cancer treatments  struggle to keep cancer cells alive in vitro for very long periods. Depending on the cell line being studied, cells may have only one cycle of viability before they die off.

Fortunately, a number of protocols and options have been developed that aid in keeping tumor cells alive longer. Some recent exciting advances in this area could eventually advance the field of personalized medicine, based on the possibility of growing and sustaining a person's own tumor cells in the lab for a long enough period of time to identify specific drug therapy for that patient's specific tumor.

## Here are five options to consider if you're seeking to keep tumor cells alive longer to advance your research.

**Note**: There can be great variation in cell viability time depending on the cell line you are using.

## 1. Reduce serum concentration

Assuming that the cancer cells under study do grow in a serum-containing media, one accepted and less intrusive method for first stopping cell division is to reduce the serum concentration, also known as serum starvation. This is done by reducing FCS or other serum to roughly 0.25 percent. Cancer cells will remain viable for several days in an incubator, though viability will gradually decrease over time. Note that viability will depend on cell type. For example, melanoma cells are known to survive longer even if completely deprived of FCS.

## 2. Double thymidine block

Try cell cycle synchronization using a double thymidine block with 2mM thymidine followed by several cell incubation phases and then a mitotic arrest. According to[this protocol](http://medschool.creighton.edu/fileadmin/user/medicine/images/TeachResearchPatient/Research/Flow_Cytometry_Core_Files/Protocols/Thymidine_Synchronization_.pdf), following the final addition of culture media, cells are synchronized in G1 and can be released into cycle over the next 16 to 20 hours, and should stay relatively synchronous for one to two cell divisions.

## 3. Time lapsed imaging

Some researchers suggest doing time-lapsed imaging to see how long your cells survive after mitotic arrest; this method is recommended since times vary widely from cell type to cell type. This may be the least invasive method for determining how long your cancer cells remain viable after mitotic arrest. Then, use synchronized cells to obtain a uniform time for cell division, following[this protocol](http://www.sciencegateway.org/protocols/cellbio/cycle/mtso.htm).

## 4. Suppression of the Aryl-hydrocarbon receptor (AhR) and UM729 for leukemic stem cells

Last year,[researchers in Canada](http://www.ncbi.nlm.nih.gov/pubmed/24562423) made what they call a significant breakthrough in growing leukemic stem cells in a laboratory setting. This has long been a major obstacle in advancing drug discovery for fighting leukemia because of the difficulty of growing stem cells that would stay intact in vitro and not lose their cancer stem cell character. Leukemic stem cells (LSCs) are viewed as a major cause of relapse in patients suffering from acute myeloid leukemia (AML), so these findings are significant. Researchers identified two small molecules that inhibited differentiation and supported LSC activity in vitro. They also identified a compound which they term UM729 that works with AhR suppressors in prevention of AML cell differentiation.

## 5. Rho kinase (ROCK) inhibitor

As we mentioned in our introduction,[researchers at Georgetown University](http://www.medicaldaily.com/fantastic-potential-researchers-keep-cells-alive-away-body-239062) have found a method to keep a variety of tumor cell types alive in the lab for longer periods of time, and this method is even being viewed as having great potential in the developing field of personalized cancer medicine. The team found that by inserting a Rho kinase (ROCK) inhibitor and fibroblast feeder cells to cancer and normal cells in a lab makes them change into stem-like cells, which can be sustained indefinitely.