

# COLON CANCER STEM CELL STUDY PROVES THEIR RESISTANCE TO HYPOXIA

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## BACKGROUND

Stem cells are an important topic in cancer research, as recent studies have revealed that they involve in tumor growth, including colon cancer. Colon cancer is the third lethal cause of cancer in the western world. Specifically, it has been demonstrated that stem cells are normally present in the intestinal villi and their main function is to produce new cells in place of those that go into apoptosis. When this process is disturbed, the stem cells produce an excess of malignant cells, with a tumor as a result. The purpose of this study is to observe the colon cancer stem cell behavior in hypoxia conditions.

## MATERIALS AND METHODS

Cancer stem cells were isolated from whole blood of a patient with colon cancer stage IV. The cells were cultivated in appropriate medium containing growth factors until they gave sufficient number of cells. Then the stem cells were cultured in conditions of normal oxygen concentration and hypoxia for ten days in order growth curves to be formed. Meanwhile, HCT-15 cell line was cultured in hypoxia so that it is used as control.

## RESULTS

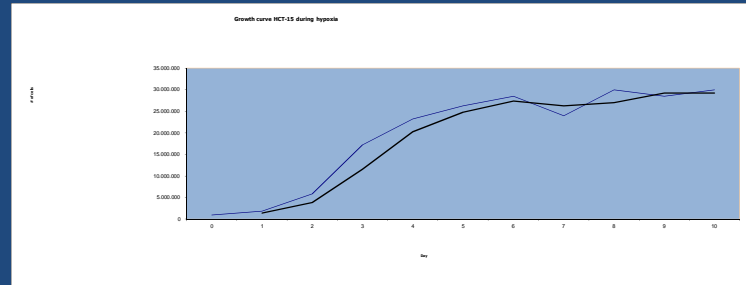
The results showed that stem cells, after an adaptation period to hypoxia, follow continuous exponential growth phases similar to those of cells grown in normal oxygen conditions.

## CONCLUSION

Colon cancer is well understood from a genetic perspective, however, current treatments are not fully able to eliminate it in advanced stages. Recent studies show that the cause is cancer stem cells, which represent a very small tumor volume. The main part of the tumor consists of the so-called traditional cancer cells, against whom current treatments are designed. The present study shows that stem cells are resistant to hypoxia conditions and that they should be studied for the production of treatments for patients with advanced stage.

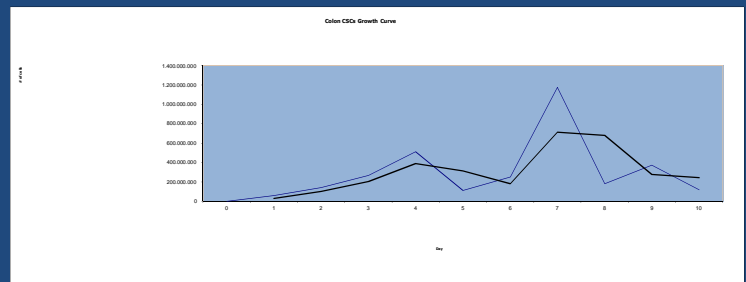
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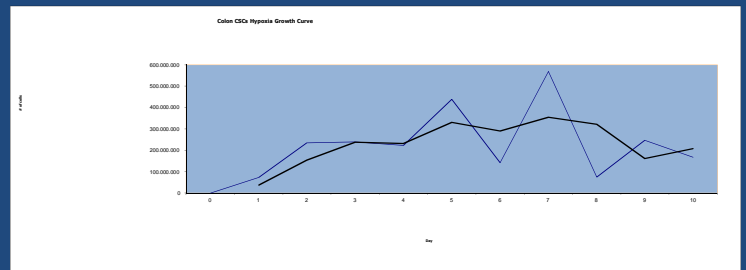
	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
total # of cells	1,000,000	1,875,000	5,850,000	17,250,000	23,250,000	26,250,000	28,500,000	24,000,000	30,000,000	28,500,000	30,000,000
fold decrease per day		1,88	3,12	2,95	1,35	1,13	1,09	0,84	1,25	0,95	1,05
fold decrease from Day 0		1,875	5,85	17,25	23,25	26,25	28,5	24	30	28,5	30

Table 1. HCT-15 growth curve analysis during hypoxia.



	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
total # of cells	1,000,000	59,000,000	142,000,000	266,000,000	512,000,000	112,000,000	251,000,000	1,176,000,000	182,000,000	373,000,000	117,000,000
fold decrease per day		59,00	2,41	1,87	1,92	0,22	2,24	4,69	0,15	2,05	0,31
fold decrease from Day 0		59	142	266	512	112	251	1176	182	373	117

Table 2. Colon Cancer Stem Cell growth curve analysis under normal oxygen concentrations.



	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
total # of cells	1,000,000	74,000,000	236,000,000	240,000,000	224,000,000	439,000,000	142,000,000	569,000,000	75,000,000	248,000,000	168,000,000
fold decrease per day		74,00	3,19	1,02	0,93	1,96	0,32	4,01	0,13	3,31	0,68
fold decrease from Day 0		74	236	240	224	439	142	569	75	248	168

Table 3. Colon Cancer Stem Cell growth curve analysis during hypoxia.

