

# Circulating Tumor Cells (CTCs) as a biomarker of relapse and metastasis: A review of 21 patients with breast cancer

## Zirkulierenden Tumorzellen (CTCs) als Biomarker für Rückfall und Metastase: Eine Überprüfung von 21 Patienten mit Brustkrebs

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### Aim

Circulating Tumour Cells are cells that have been detached from the primary tumour and entered the blood stream. Due to the fact that they transfer the genetic information of the primary tumour, CTCs and especially their subpopulation with stem cell-like phenotype (Cancer Stem cell-like Cells, CSCs), consider to be a useful key in the prediction of relapse and metastasis in patients with breast cancer. For their features and because breast cancer is the most frequent type of cancer worldwide, they tend to be attractive for scientists of the breast cancer research field.

### Materials and methods

Whole blood was collected from 21 patients with breast cancer, men and women of all stages. Circulating Tumor Cells were sorted from the primary sample with the use of specific markers. Finally, the CTCs were counted and tested for the presence of specific antigens with flow cytometry.

### Results

A personal record was formed for each patient. Every time that a sample was received from the same patient, the same procedure followed and the data were drawn for follow up. Every patient had at least two follow up results. The final data were evaluated and correlated to the risk of relapse and metastasis according to the clinical evaluation of the patient, received from his/hers oncologist. The results showed that the number of CTCs, depending their features, can be used as marker of relapse and metastasis.

Patient	Stage	Primary # of CTCs	Follow up 1 (# of CTCs)	Follow up 2 (# of CTCs)	CLINICAL EVALUATION
6	Unknown	-	2,2 cells/7,5ml	-	-
10	Unknown	-	3,9cell/7,5ml	-	-
11	Unknown	3,1cells/7,5ml	3,5cells/7,5ml	3,8 cells/7,5ml	-
19	Unknown	3,7cells/7,5ml	4,2cells/7,5ml	-	Complete response
20	Unknown	3cells/7,5ml	2,6cells/7,5ml	3cells/7,5ml	Progress of disease
15	I	6,2cells/7,5ml	-	-	Progress of disease
17	I	-	9,1cells/7,5ml	8,3cells/7,5ml	Complete response
18	I	-	7,8cells/7,5ml	7,7cells/7,5ml	Complete response
2	IIA	4,8cells/7,5ml	5,4cells/7,5ml	-	stable disease-progress of disease
3	IIA	5,9cells/7,5ml	4,6cells/7,5ml	5 cells/7,5ml	-
5	II	-	3,3cells/7,5ml	-	progress of disease
7	II	4,9cells/7,5ml	4,4cells/7,5ml	-	partial response
8	IIB	6,3cells/7,5ml	6,1cells/7,5ml	5,9 cells/7,5ml	progress of disease
9	IIA	-	4,4cells/7,5ml	4,2cells/7,5ml	progress of disease
12	II	4 cells/ 7,5ml	3,9cells/7,5ml	-	-
13	IIA	3,5cells/7,5ml	3,9cells/7,5ml	3,8 cells/7,5ml	stable disease-progress of disease
1	IV	4,1cells/7,5ml	3,3cells/7,5ml	-	progress of disease
14	IV	-	6,3cells/7,5ml	-	Progress of disease
16	IV	5,8cells/7,5ml	6,6cell/7,5 ml	4,7cells/7,5ml	Partial response
21	IV	2,5cells/7,5ml	7,4cells/7,5ml	5,8cells/7,5ml	Partial response

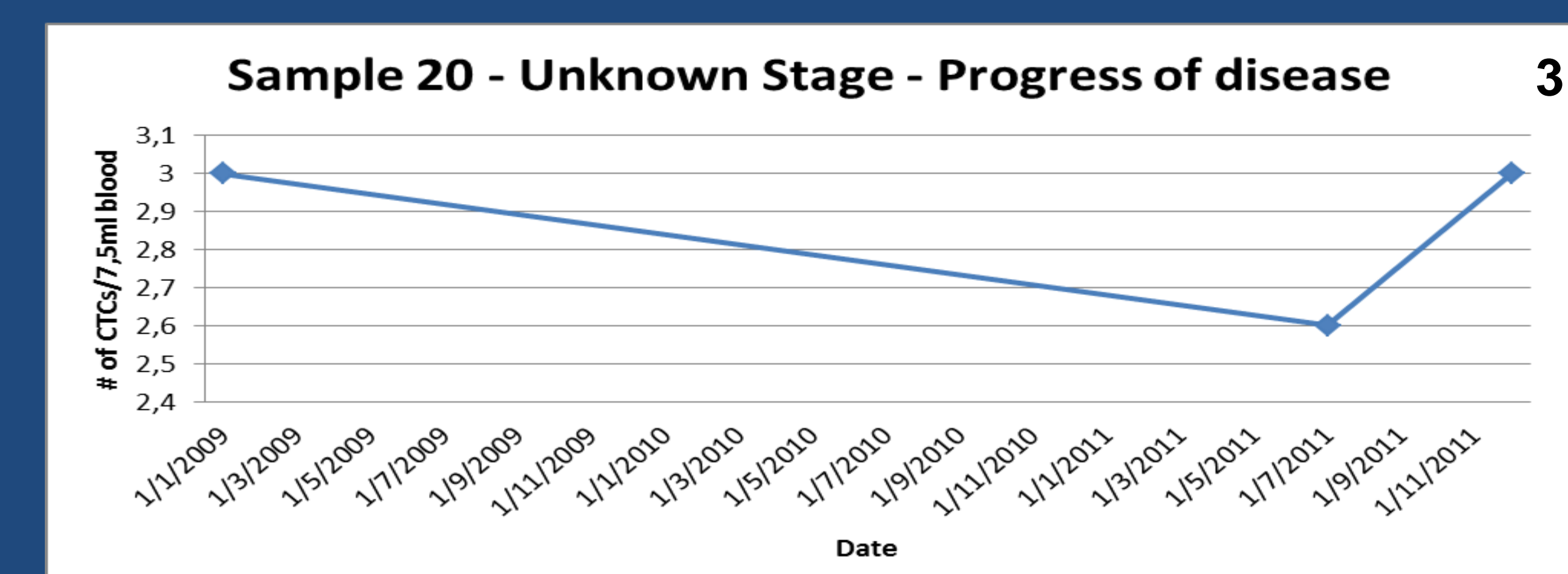
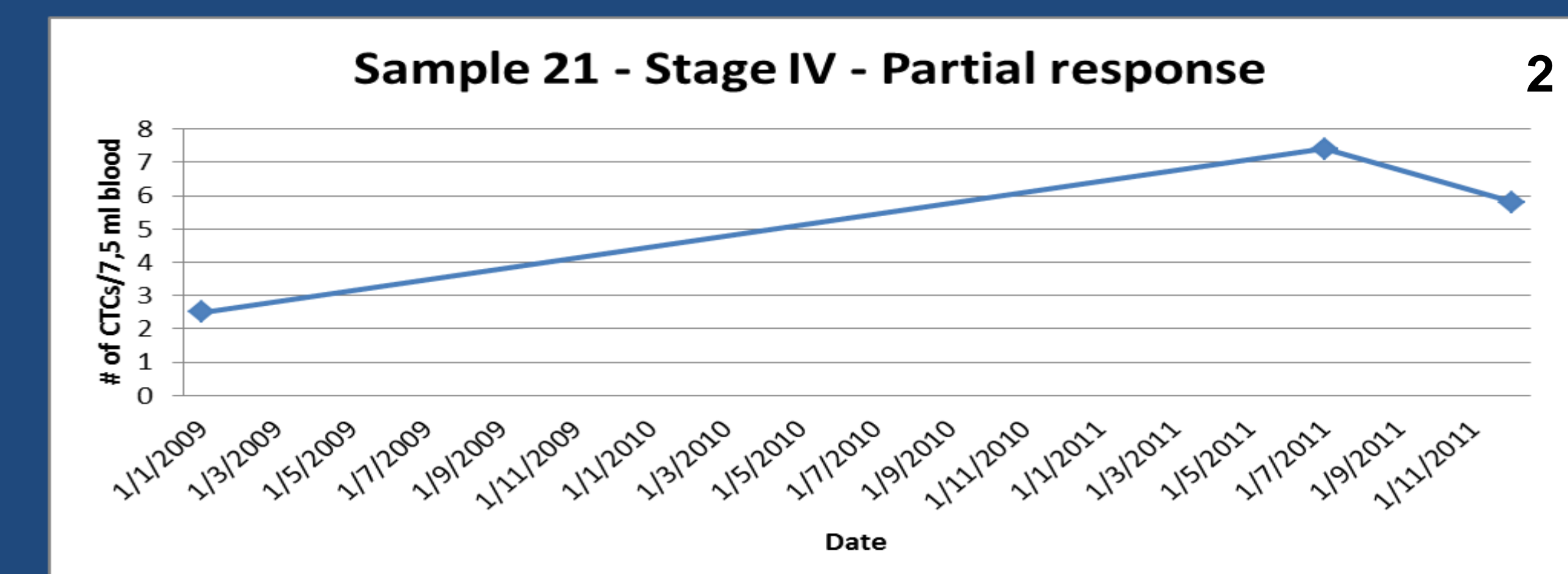
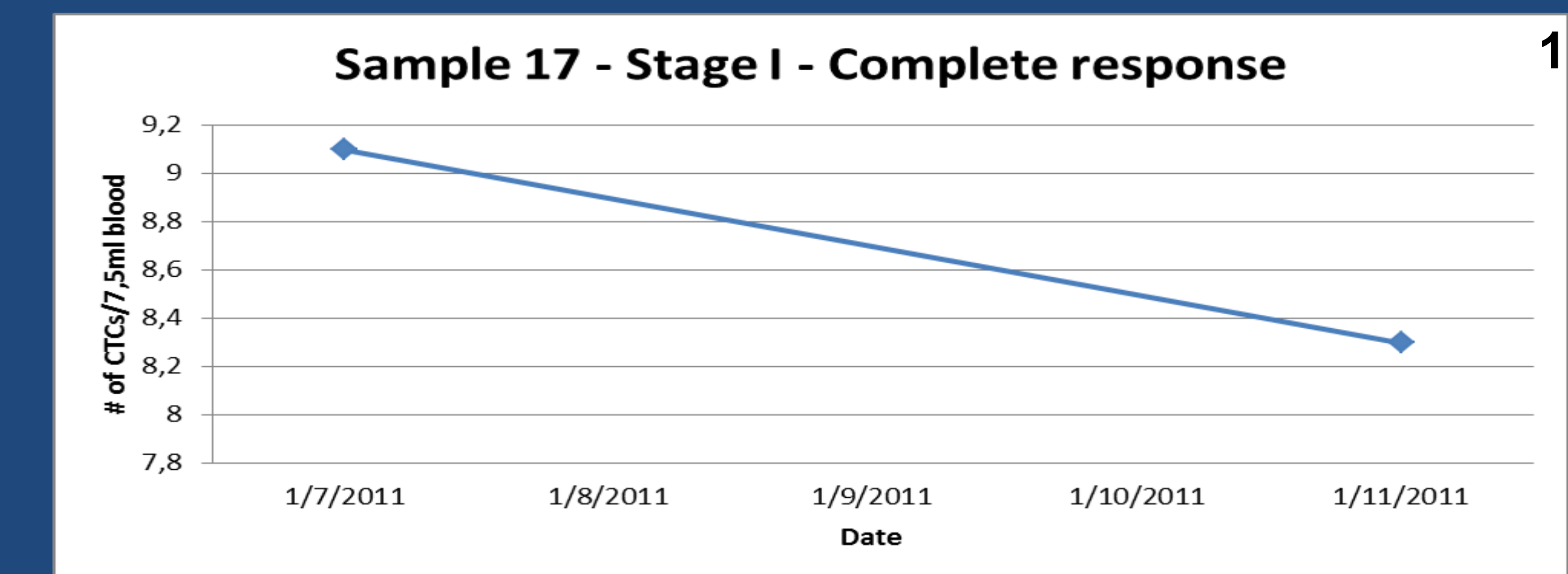
Table 1. Summary results of the number of circulating tumor cells per patient, per stage and per follow up.

### Conclusion

*The present study made an effort to explain whether Circulating Tumor Cells and their sub-population Cancer Stem cell-like Cells can be used as a biomarker of relapse and metastasis prognosis in breast cancer patients. The data are encouraging and the study should be extended to a larger number of samples.*

### References

- 1.Circulating Tumor Cells in Breast Cancer: Blood Will Tell, George W. Sledge, Jr. Clin Cancer Res 2006;12:6321-6322. Published online November 3, 2006.
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Diagrams 1, 2, 3. represent the # of CTCs, the stage and the clinical evaluation of three patients with breast cancer over time.

### Disclosure of Potential Conflicts of Interest

None of the authors of the above study has declared any conflict of interest

