



Circulating Tumor Cells: From Fiction to Reality

Chiara Nicolazzo¹, Federica Francescangeli², Flavia Loreni¹, Nicole Caputo¹, Luciano Colangelo³, Chiara Sonato³, Giada della Grotta³ and Walter Gianni^{3*}

¹Department of Molecular Medicine, Sapienza University of Rome, Italy

²Department of Hematology, Istituto Superiore di Sanità, Italy

³Department of Internal Medicine and Geriatrics, Policlinico Umberto I, II, Sapienza University of Rome, Italy

Clinical Image

Described for the first time by Ashworth in 1869 [1], circulating tumor cells are considered silent predictors of metastasis [2]. Indeed, their generation is a fundamental prerequisite to the tumors metastatic process [3], making them a non-invasive appealing tool for precision medicine.

Although a flawless method has not yet been identified, the countless technological efforts to detect isolate and characterize CTCs [4], make them suitable for clinical applications and promising for future translational uses.

To date, though the predictive significance of CTCs is still under debate [5], robust data demonstrate that such cells have an undoubted prognostic value in patients with solid tumors, such as breast [6], colorectal [7], prostate [8] and gastric cancers [9]. Furthermore, the possibility to find CTCs even in non-metastatic [10] as well as rare tumors, such as sarcoma [11,12] or hemangiopericytoma [13], opens new horizons toward a best understanding of disease biology in order “to fight the enemy with the right weapons”.

Acknowledgement

The authors would like to thank Dr. Ann Zeuner for her expert technical assistance.

Financial Support

This work was supported by A.R.Ger.On. Onlus.

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*Correspondence:

Walter Gianni, Department of Internal Medicine and Geriatrics, Policlinico Umberto I, II, Sapienza University of Rome, Viale del Policlinico 155, Rome, 00161, Italy, Tel: 39(0)64451286; E-mail: walgianni@hotmail.it

Received Date: 13 Apr 2018

Accepted Date: 20 May 2018

Published Date: 09 Jun 2018

Citation:

Nicolazzo C, Francescangeli F, Loreni F, Caputo N, Colangelo L, Sonato C, et al. Circulating Tumor Cells: From Fiction to Reality. *Clin Oncol.* 2018; 3: 1475.

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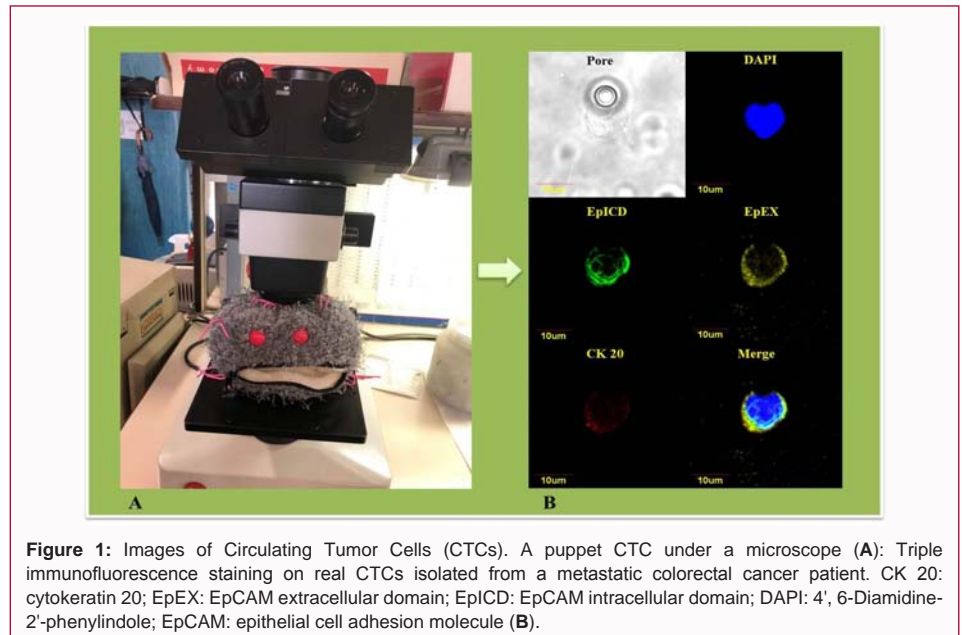


Figure 1: Images of Circulating Tumor Cells (CTCs). A puppet CTC under a microscope (A): Triple immunofluorescence staining on real CTCs isolated from a metastatic colorectal cancer patient. CK 20: cytokeratin 20; EpEX: EpCAM extracellular domain; EpICD: EpCAM intracellular domain; DAPI: 4', 6-Diamidine-2'-phenylindole; EpCAM: epithelial cell adhesion molecule (B).

References

1. Ashworth TR. A case of cancer in which cells similar to those in the tumours were seen in the blood after death. *Australian Medical Journal.* 1869;14:146-147.
2. Zhou L, Dicker DT, Matthew E, El-Deiry WS, Alpaugh RK. Circulating tumor cells: silent predictors of

- metastasis. *F1000Res*. 2017;6.
3. Yan WT, Cui X, Chen Q, Li YF, Cui YH, Wang Y, et al. Circulating tumor cell status monitors the treatment responses in breast cancer patients: a meta-analysis. *Sci Rep*. 2017;7:43464.
 4. Ferreira MM, Ramani VC, Jeffrey SS. Circulating tumor cell technologies. *Mol Oncol*. 2016;10(3):374-94.
 5. Cabel L, Proudhon C, Gortais H, Loirat D, Coussy F, Pierga JY, et al. Circulating tumor cells: clinical validity and utility. *Int J Clin Oncol*. 2017;22(3):421-430.
 6. Lv Q, Gong L, Zhang T, Ye J, Chai L, Ni C, et al. Prognostic value of circulating tumor cells in metastatic breast cancer: a systemic review and meta-analysis. *Clin Transl Oncol*. 2016;18(3):322-30.
 7. Tan Y, Wu H. The significant prognostic value of circulating tumor cells in colorectal cancer: A systematic review and meta-analysis. *Curr Probl Cancer*. 2018;42(1):95-106.
 8. Zheng Y, Zhang C, Wu J, Cheng G, Yang H, Hua L, et al. Prognostic value of circulating tumor cells in castration resistant prostate cancer: A meta-analysis. *Urol J*. 2016;13(6):2881-2888.
 9. Yang C, Zou K, Yuan Z, Guo T, Xiong B. Prognostic value of circulating tumor cells detected with the CellSearch System in patients with gastric cancer: evidence from a meta-analysis. *Onco Targets Ther*. 2018;11:1013-1023.
 10. Lu YJ, Wang P, Peng J, Wang X, Zhu YW, Shen N. Meta-analysis reveals the prognostic value of circulating tumour cells detected in the peripheral blood in patients with non-metastatic colorectal cancer. *Sci Rep*. 2017;7(1):905.
 11. Nicolazzo C, Gradilone A. Significance of circulating tumor cells in soft tissue sarcoma. *Anal Cell Pathol (Amst)*. 2015;2015:697395.
 12. Tellez-Gabriel M, Brown HK, Young R, Heymann MF, Heymann D. The Challenges of Detecting Circulating Tumor Cells in Sarcoma. *Front Oncol*. 2016;6:202.
 13. Nicolazzo C, Colangelo L, Corsi A, Carpino G, Gradilone A, Sonato C, et al. Liquid Biopsy in Rare Cancers: Lessons from Hemangiopericytoma. *Anal Cell Pathol (Amst)*. 2018;2018:9718585.