

## more than a marker for cancer stem cells

Marta Ferrer Fernández – Biochemistry Degree – Bachelor's Thesis – June 2016

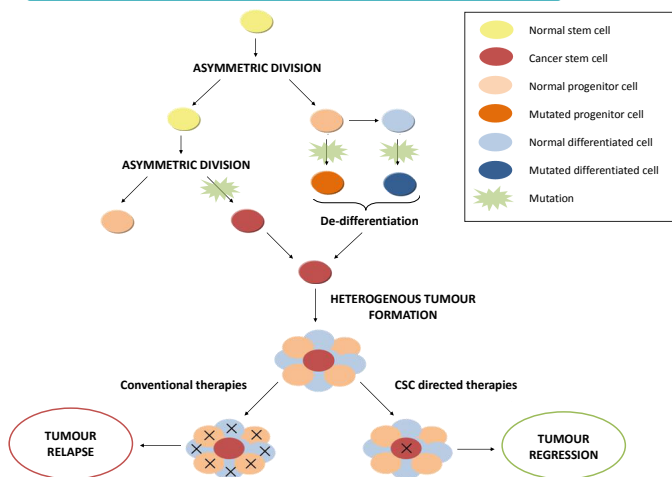
### INTRODUCTION

#### CANCER STEM CELLS (CSCs)...

- Are a small tumour cell subpopulation that can initiate and drive tumourigenic growth
- Carry out an asymmetric division: they are able to renew themselves and they can also differentiate

- Can arise from mutations in normal stem cells, progenitor or mature differentiated cells
- Are responsible for therapy failure, recurrence and metastasis
- Give another perspective in the treatment against cancer → Aldehyde dehydrogenase as a candidate target

### 1. CANCER STEM CELLS AND THEIR ORIGIN



### 2. ALDEHYDE DEHYDROGENASE

- Aldehyde dehydrogenases (ALDH) are enzymes that catalyse the oxidation of aldehydes to their consequent acids by a NAD(P)<sup>+</sup>-dependent irreversible reaction
- This enzyme oxidises and detoxifies aldehydes that can be harmful to the organism
- ALDH is considered a marker for CSCs, identifiable by the Aldefluor assay

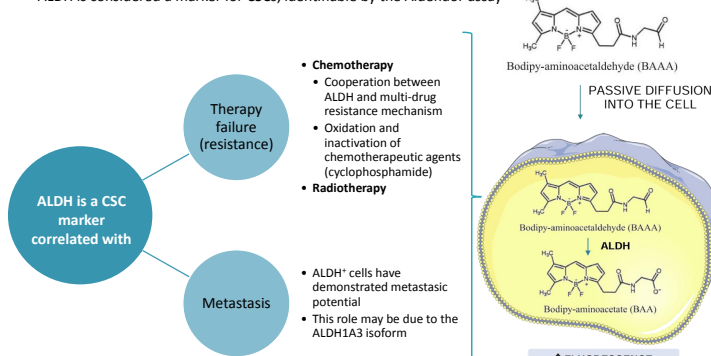


Figure was produced using Servier Medical Art ([www.servier.com](http://www.servier.com))

Existence of CSCs

Tumour initiation and growth

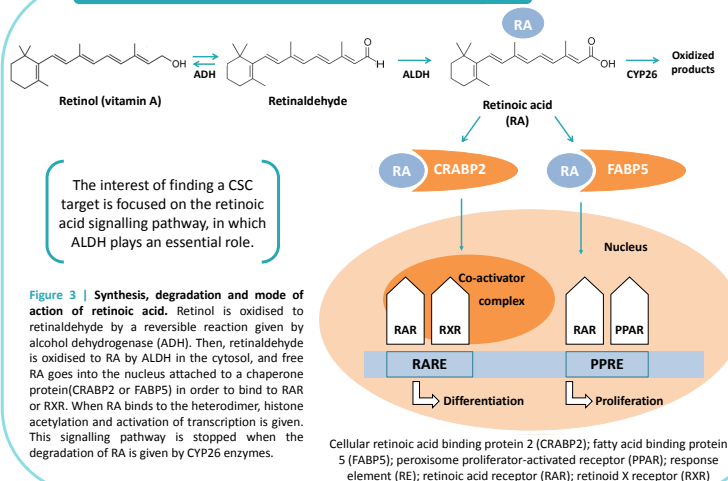
Conventional therapies failure

Tumour recurrence

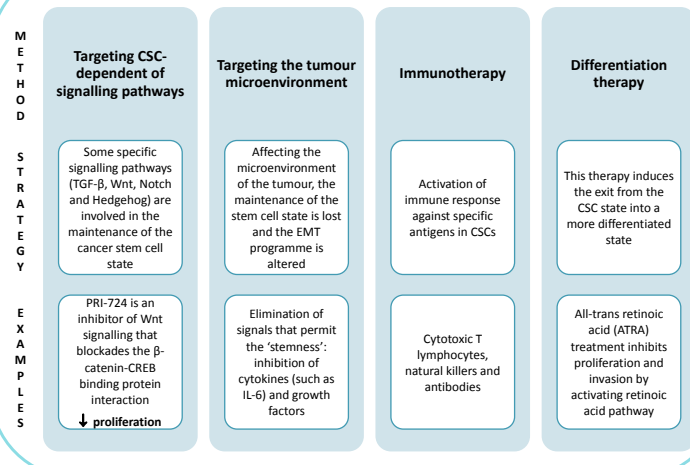
Metastasis

Need for targeted therapies against CSCs

### 3. RETINOIC ACID SIGNALLING PATHWAY



### 4. THERAPIES THAT TARGET CSCs



### 5. CONCLUSIONS

1. CSCs open new frontiers in the treatment against cancer
2. ALDH is a good marker for CSCs because its identification and isolation is easier thanks to the Aldefluor Assay
3. Resistance to conventional therapies and metastasis can be explained by CSCs, where ALDH plays a valuable role on this matter
4. ATRA could be a novel cancer therapy by producing retinoic acid and causing differentiation, although non-CSCs also have to be eliminated to eradicate all the bulk of the tumour by conventional therapies

ALDH is not only a marker for cancer stem cells, and further studies are needed to resolve more questions about cancer

### RELEVANT REFERENCES

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Molecules in Figure 2 are from: Stem Cell Technologies. Technical Bulletin - Identification of viable stem and progenitor cells with Aldefluor [Online]. France; 2009. [Consultation 7/4/2016]. Available in: [https://www.stemcell.com/~media/Technical%20Resources/0/0/28728\\_aldefluor\\_July%202009.pdf?la=en](https://www.stemcell.com/~media/Technical%20Resources/0/0/28728_aldefluor_July%202009.pdf?la=en)