

“SCIENTIFIC PILL”
TUMORAL CONTROL BY RADIATION
CURVE DOSE-RESPONSE



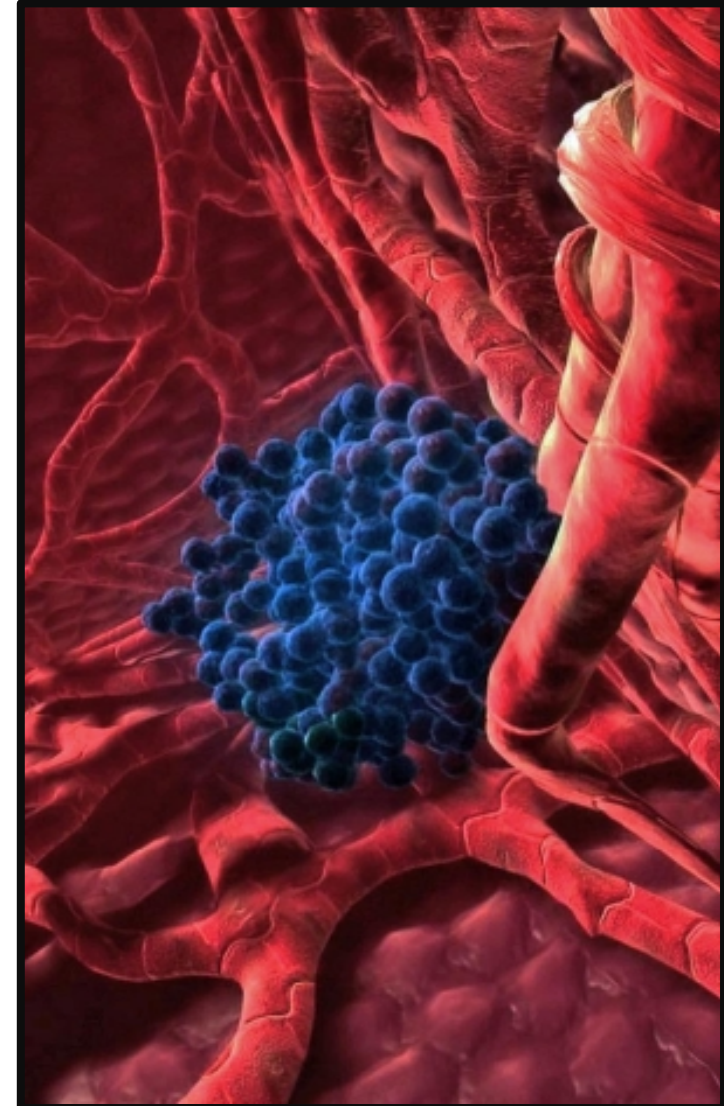
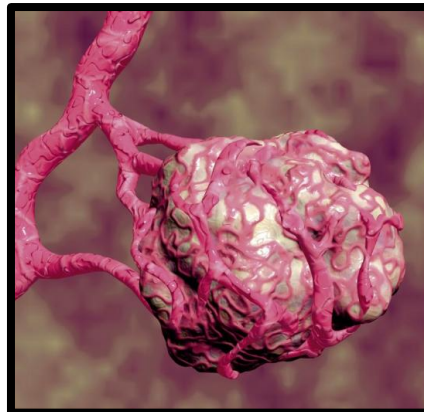
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Tumoral Control by Radiation. Curve dose-response.

TUMORAL BIOLOGY

- Protooncogene activation
- Inhibitory cancer genes inhibition
- Death pathway inhibition
- Locoregional invasion
- Metastasis
- Atypic cells
- Angiogenesis
- Uncontrolled proliferation

(1)



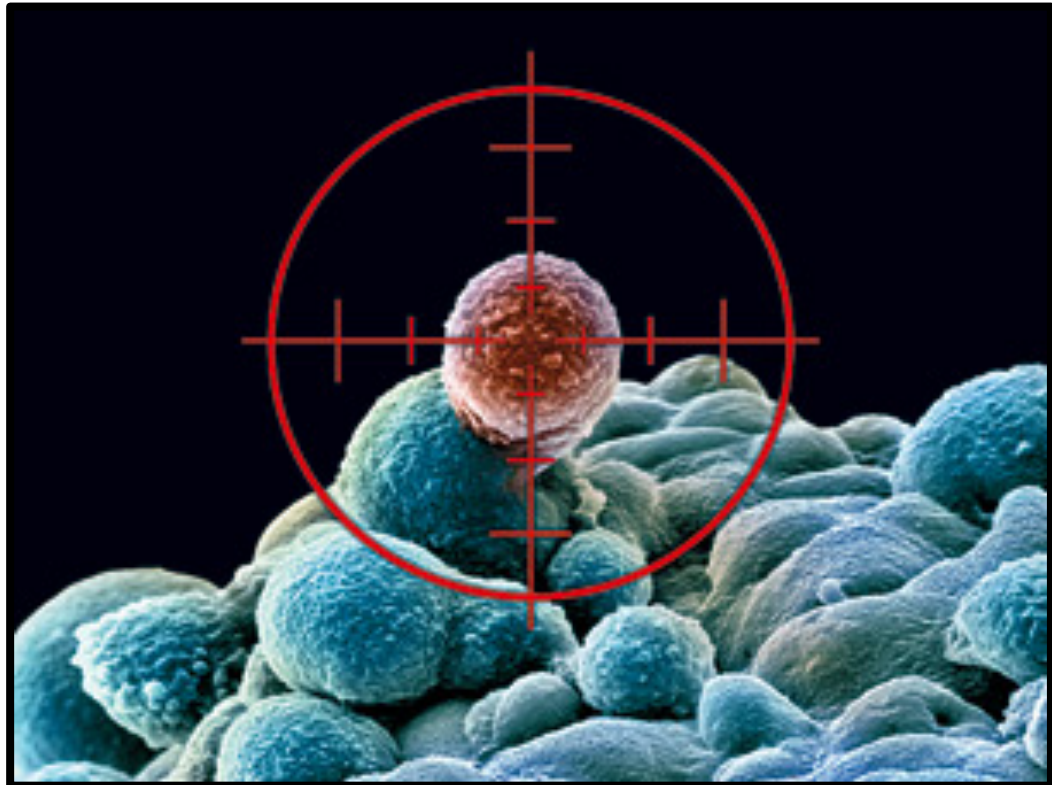
Tumoral Control by Radiation.
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HOW CAN WE CONTROL TUMORS?

Chemotherapy

Radiotherapy

Surgery



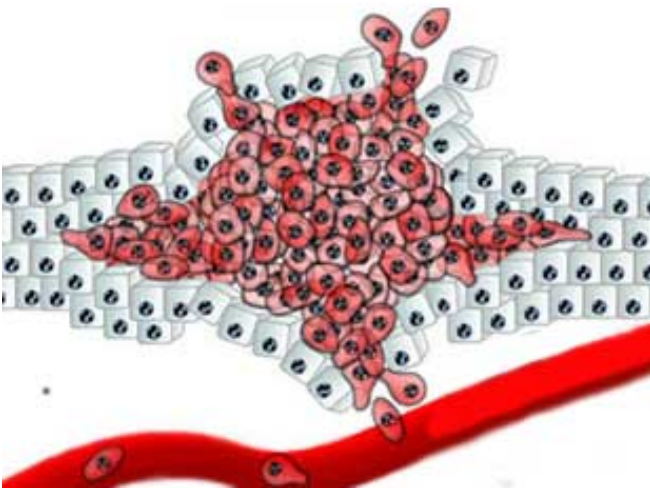
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TUMORAL CONTROL

**Tumoral
Mass**

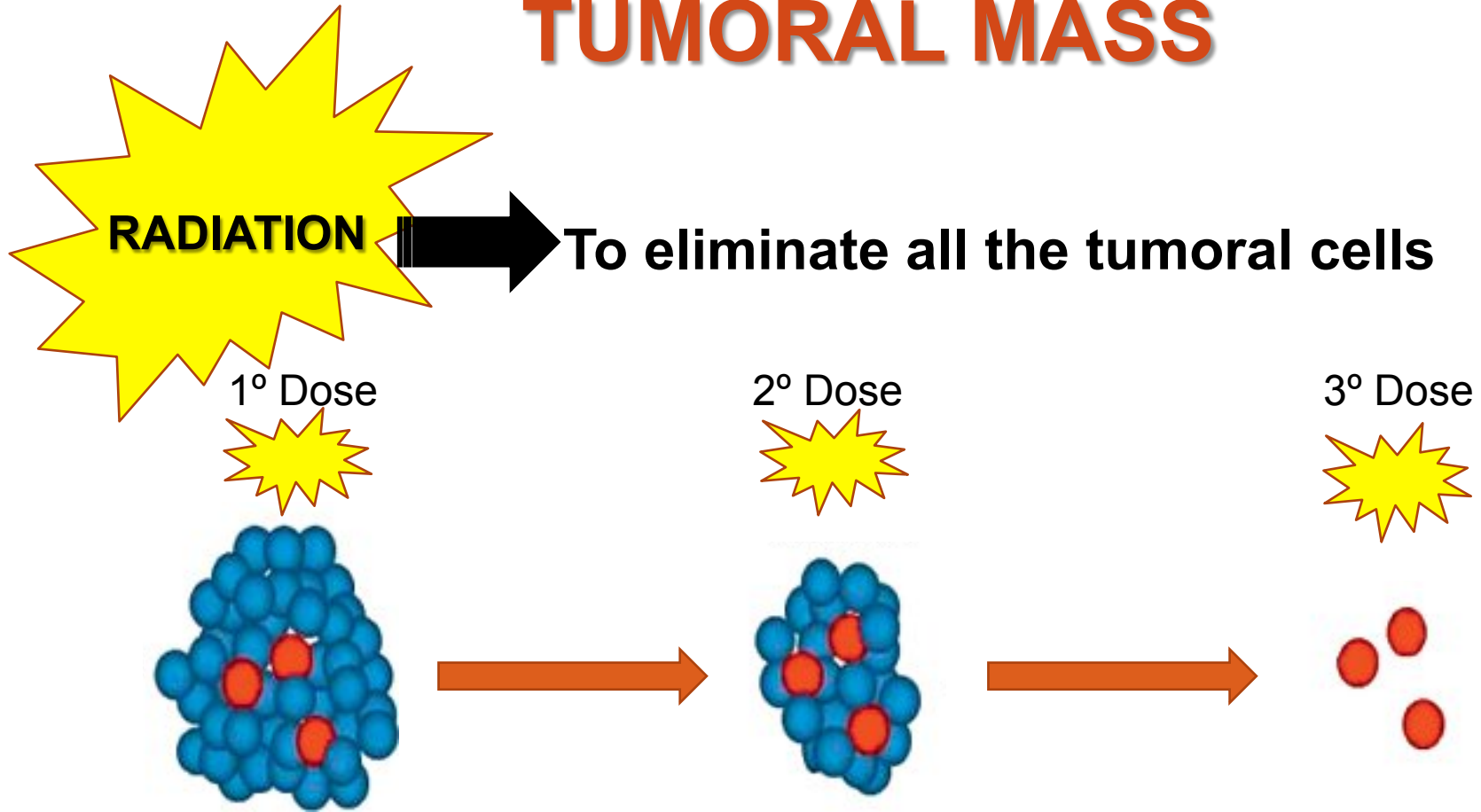
**Survival
Scale**



- 1) Radiosensitivity
- 2) Reoxygenation
- 3) Reparation
- 4) Repopulation

Tumoral Control by Radiation. Curve dose-response.

TUMORAL MASS



Unique/Split Dose → Mass Reduction → Possitive response

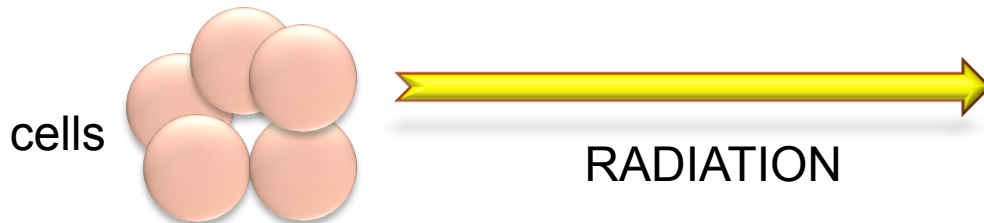
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SURVIVAL SCALE

1) RADIOSENSITIVITY

Relative susceptibility of cells to the injurious action of radiation.

Tumoral cells are more sensitive to radiation due to their high proliferation, their metabolism...



Tumoral Control by Radiation. Curve dose-response.

SURVIVAL SCALE

2) REOXYGENATION

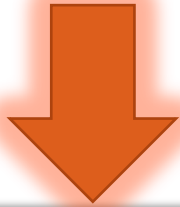


Oxygen captures RL, making stronger the radiation effect

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SURVIVAL SCALE

Cells which are
next to the vein,

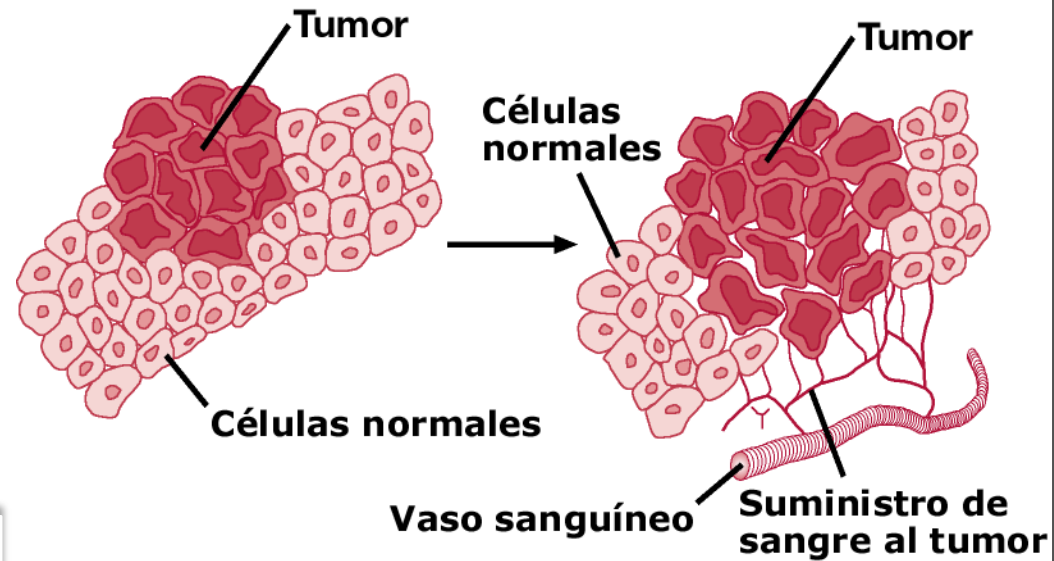


Are more oxygenated,



And they become more sensitive to
radiation

REOXIGENACIÓN



Tumoral Control by Radiation.

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SURVIVAL SCALE

3) REPARATION

Recover the DNA that existed before the injury.

DAMAGES



LETHAL: **NON-REPARABLES**.

Direct DNA Damage.

Unique-sharp Dose. DEATH



NON-LETHAL: **REPARABLE**.

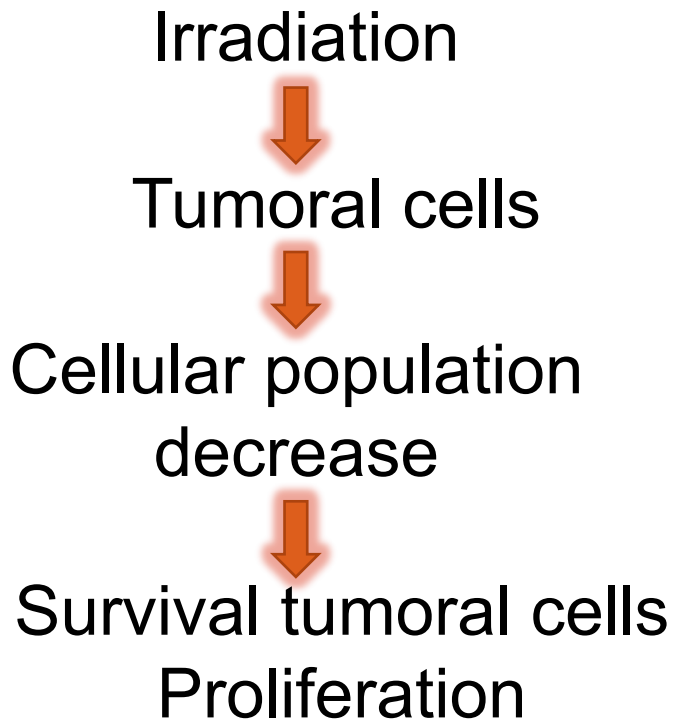
Non-Direct DNA Damage. Split Dose.

The dose rate influences the cell ability to be repaired after the irradiation.

Tumoral Control by Radiation. Curve dose-response.

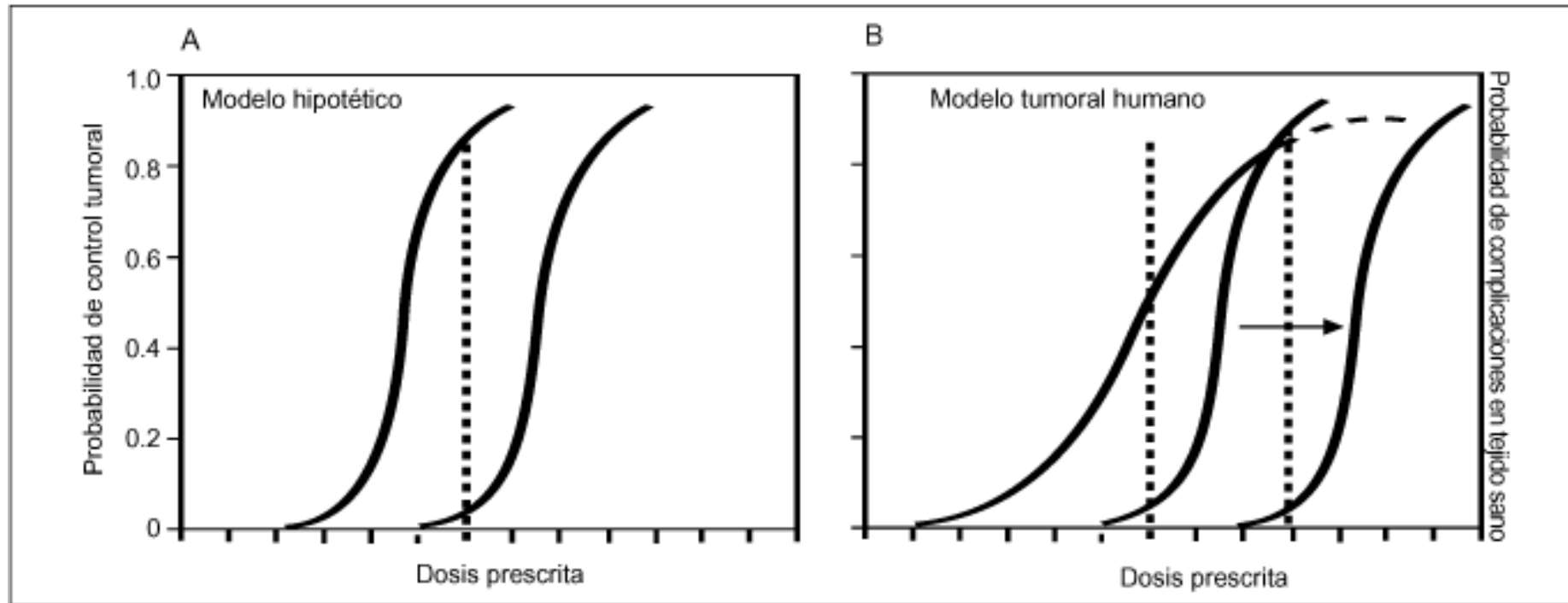
SURVIVAL SCALE

4) REPOPULATION



Tumoral Control by Radiation. Curve dose-response.

DOSE-RESPONSE CURVE



Figs. 1A y 1B

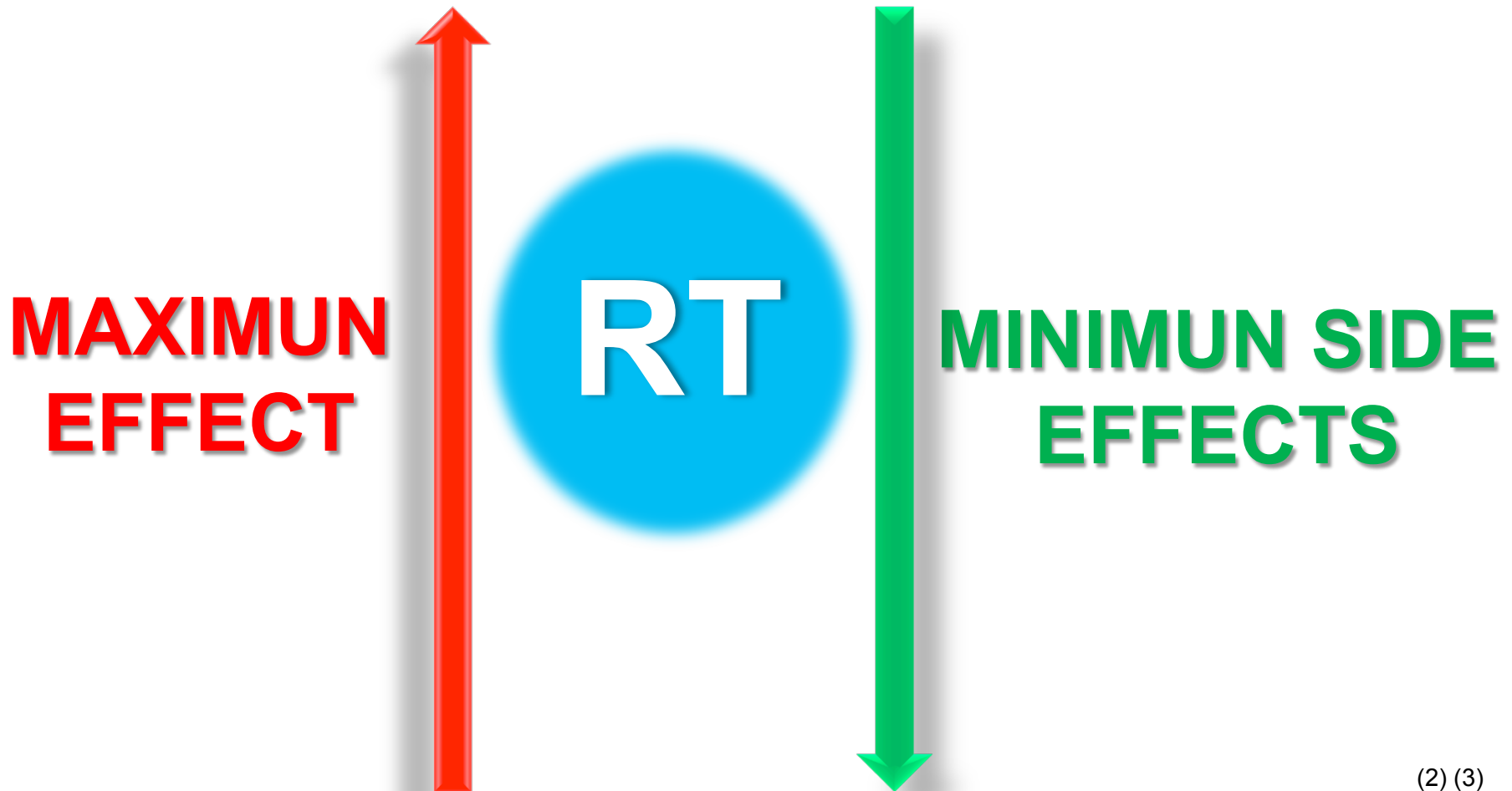
Radiation Dose/ Cellular Response

(2) (3) (4)

The dose-response curve goes parallel to the curve which evaluates the complications in the healthy tissue.

Tumoral Control by Radiation.
Curve dose-response.

CURVE DOSE-RESPONSE OBJECTIVE



Tumoral Control by Radiation.

Curve dose-response.

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- (1) Angiogenesis in cancer - general pathways and their therapeutic implications. Dimova I, Popivanov G, Djonov V. J Buon 2014;19(1):15-21.
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- (3) Radiotherapy-induced skin reactions: assessment and management. Glover D, Harmer V. Br J Nurs. 2014;12;23(4):S28, S30-5.
- (4) Radioterapia conformada en tres dimensiones con intensidad modulada (IMRT): Nuevas estrategias en tumores de cabeza y cuello. Contreras Martinez J, Herruzo Cabrera I. *Oncología (Barc.)* 2004; 27 (1):16-24.