

# Gold nanoparticles to improve cancer radiotherapy



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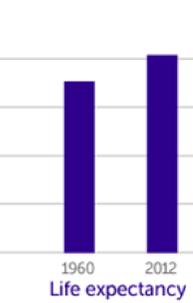
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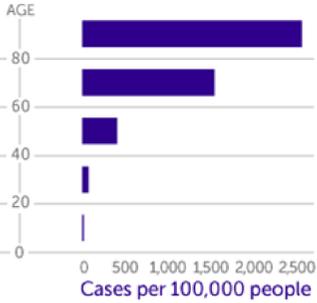
**Cancer deaths increase each year : 14 millions new cases and 8.8 million deaths /year**

IT'S MOSTLY BECAUSE WE LIVE LONGER NOW...



Lifetime risk increase, Cancer research UK, 2015

...AND CANCER RISK INCREASES WITH AGE



**Half of cancer patients receive radiotherapy as part of their treatment**

**However:** Toxic for surrounding tissues and cancers acquire radioresistance

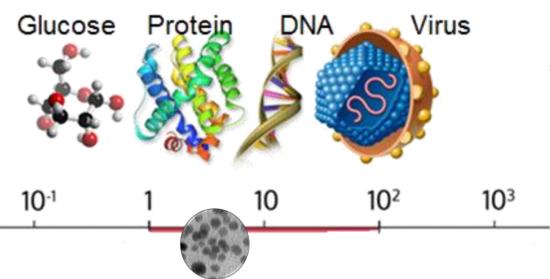
**How to improve radiotherapy?** → Heavy elements nanoparticles (NPs)

better targeting of cancer tissues



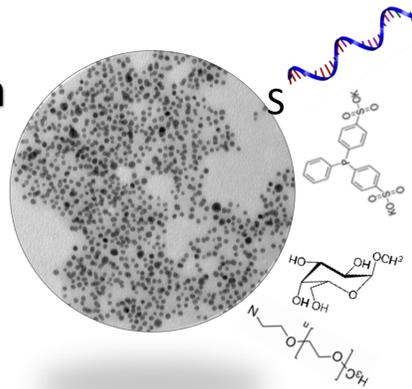
**What are nanoparticles?**

<100 nm



**Gold, biocompatible, cell permeability, coating**

2-5 nm



**Cell models:** Oral SCC and control keratinocytes (HSC-3) (HaCaT)

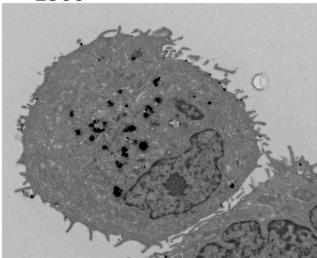
**Assays:** Uptake and localisation of AuNPs. Dose-toxicity (clonogenic assay). Mechanisms of toxicity.

**Results: NPs selectively accumulate in skin cancer cells**

TEM images

HSC-3

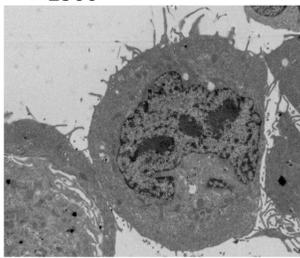
× 2500



High uptake in cancer cells, especially in lysosomes.

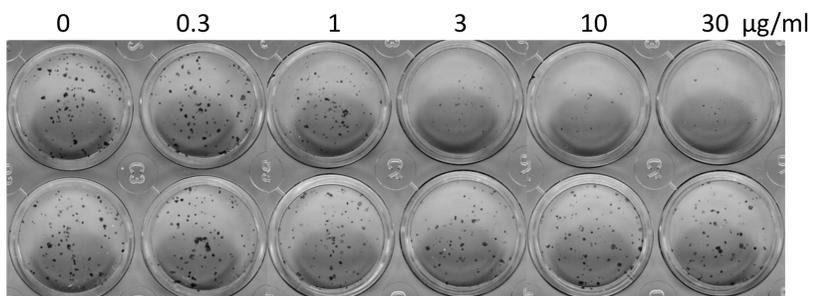
HaCaT

× 2500



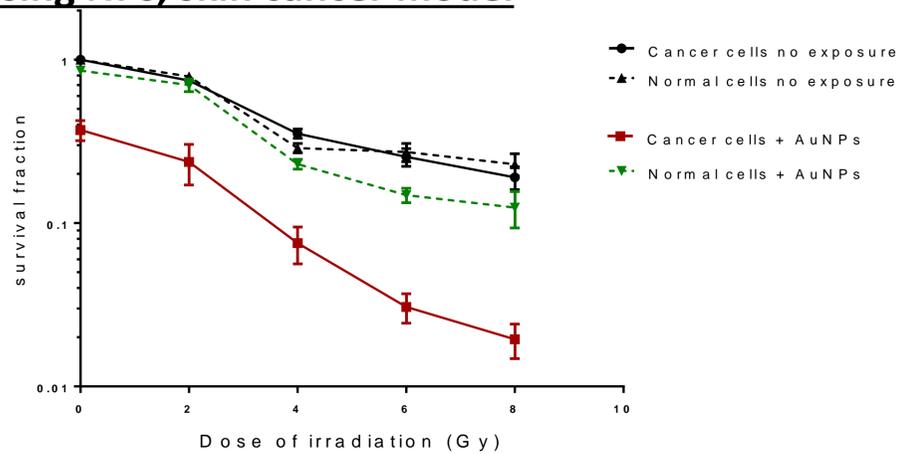
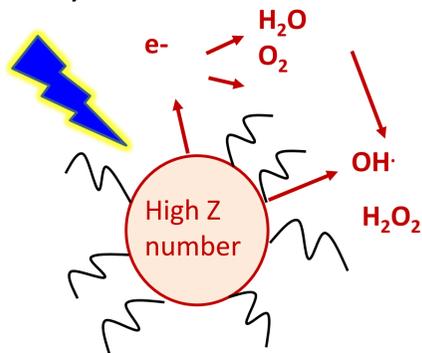
Low uptake in normal cells.

**AuNPs uptake cause selective cancer cell toxicity**



**Improvement of radiotherapy using NPs, skin cancer model**

X-ray



**Conclusions:**

Gold NPs selectively toxic for cancer cells, Promising for combining with radiotherapy  
Team work with physicists, chemists, practitioners, toward a revolutionary cancer treatment

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