

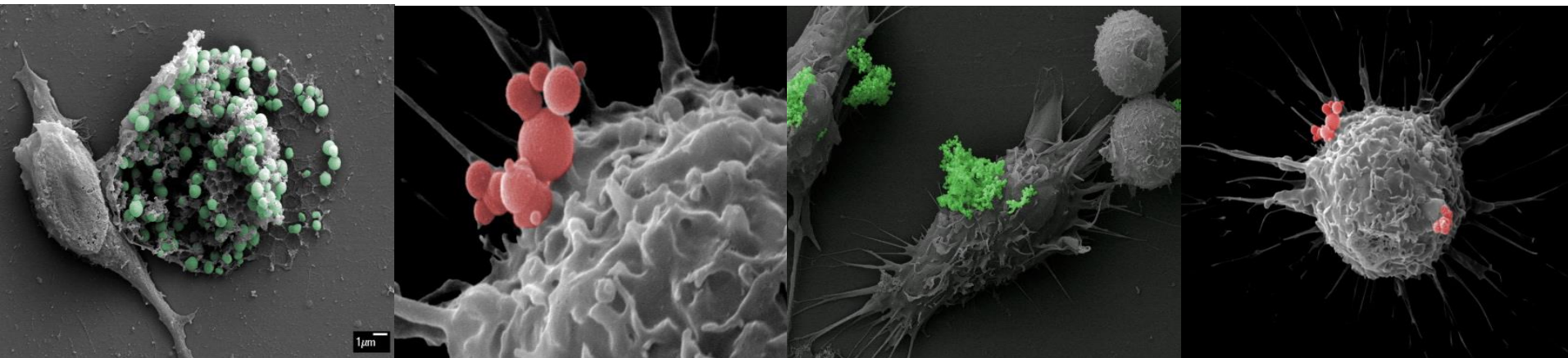
NANOIMMUNOTECH:

Global Solutions in NanoBiotechnology

Anaïs Normand

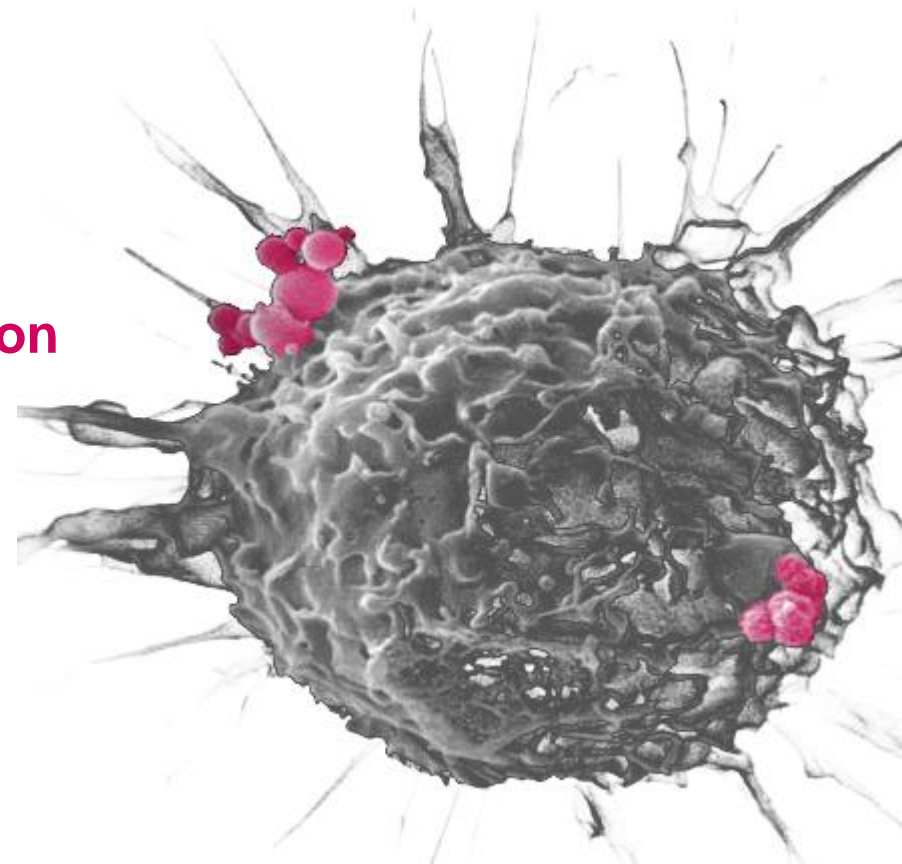
Marketing Manager

a.marketing@nanoimmunotech.es



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- 1- NanoBIOTEchnology
- 2- Nanoimmunotech
- 3- NITZIPPER: Bioconjugation Solution
- 4- NITCHARACTER
- 5- NITBIOSAFE
- 6- NITBIOSENSING
- 7- R&D Activity



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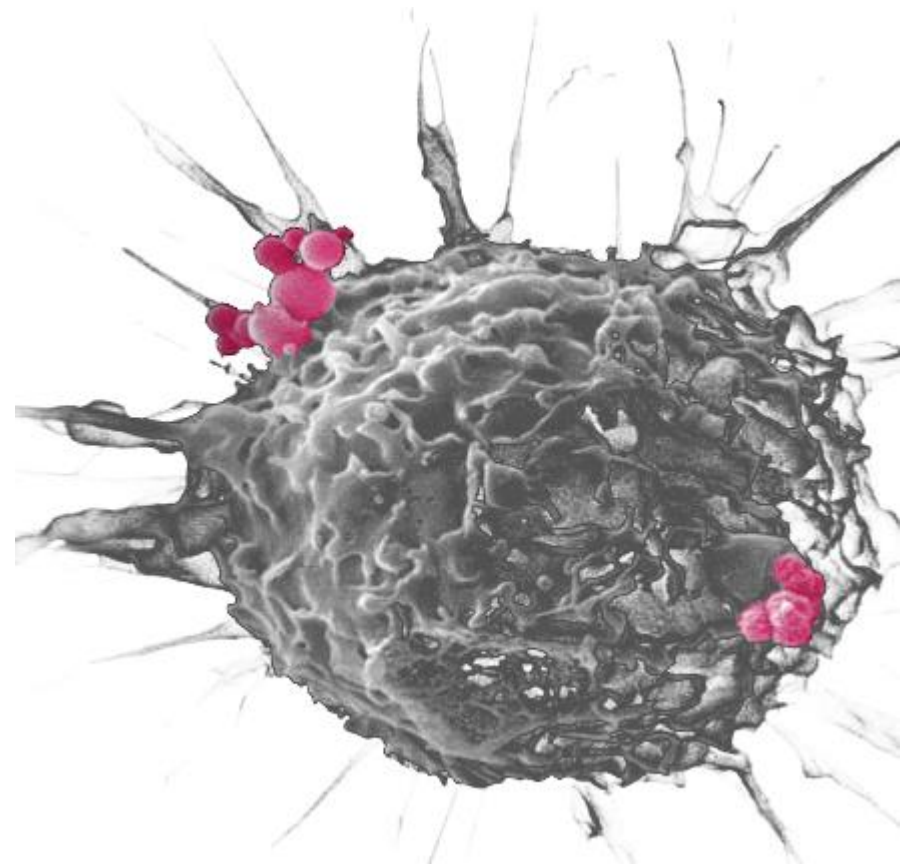
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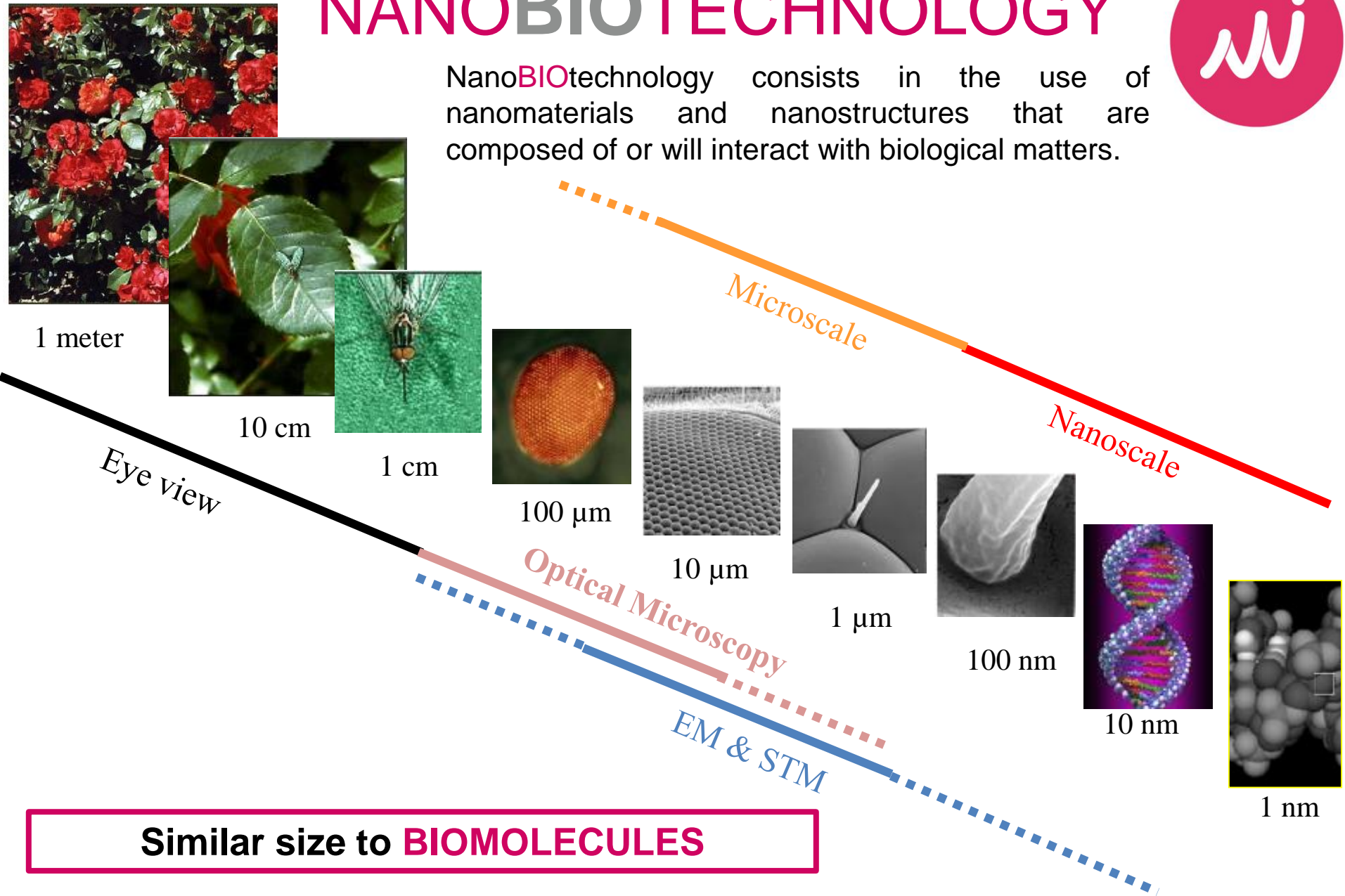
7- R&D Activity



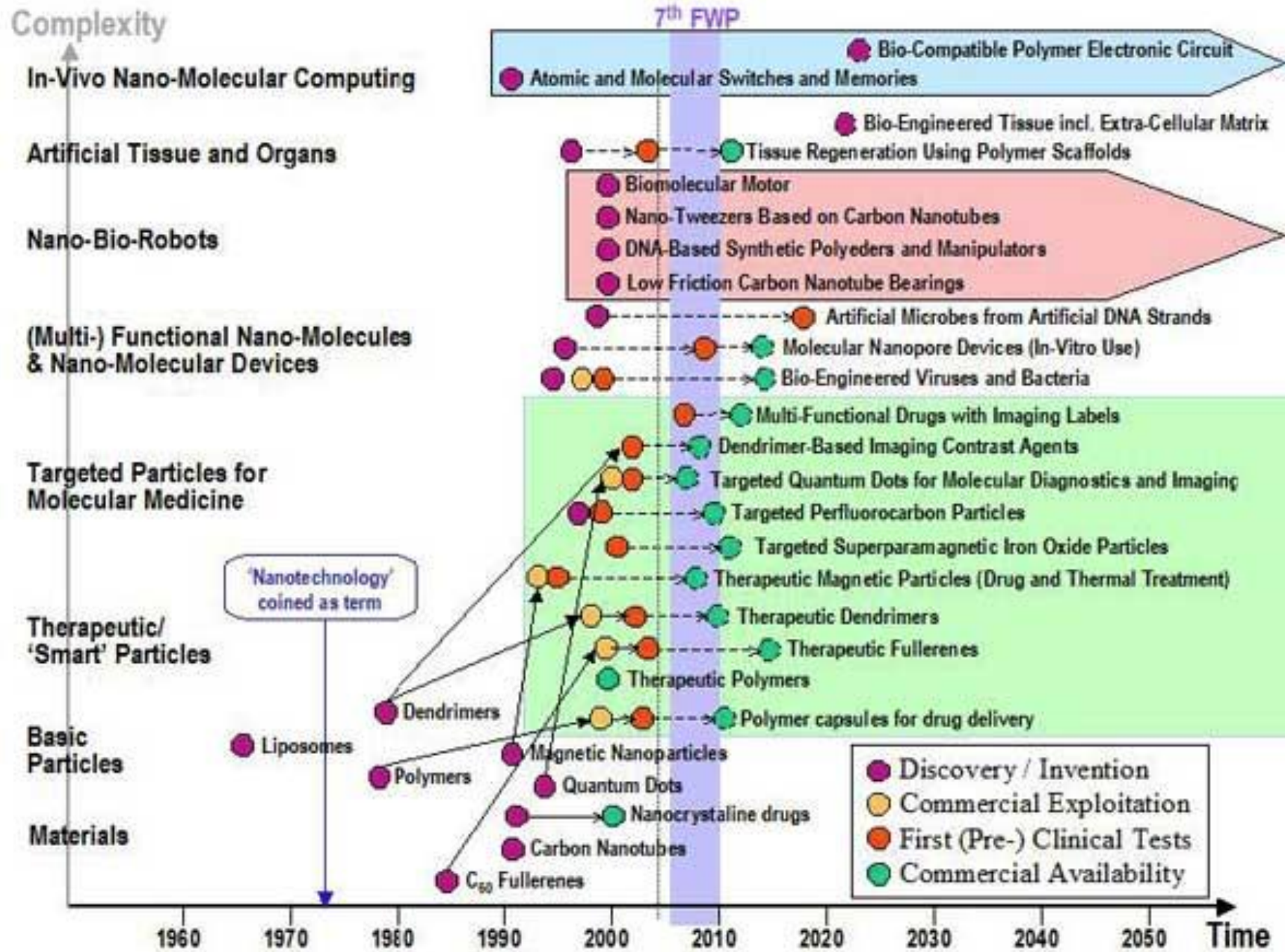
NANOBIOTECHNOLOGY



NanoBIOtechnology consists in the use of nanomaterials and nanostructures that are composed of or will interact with biological matters.



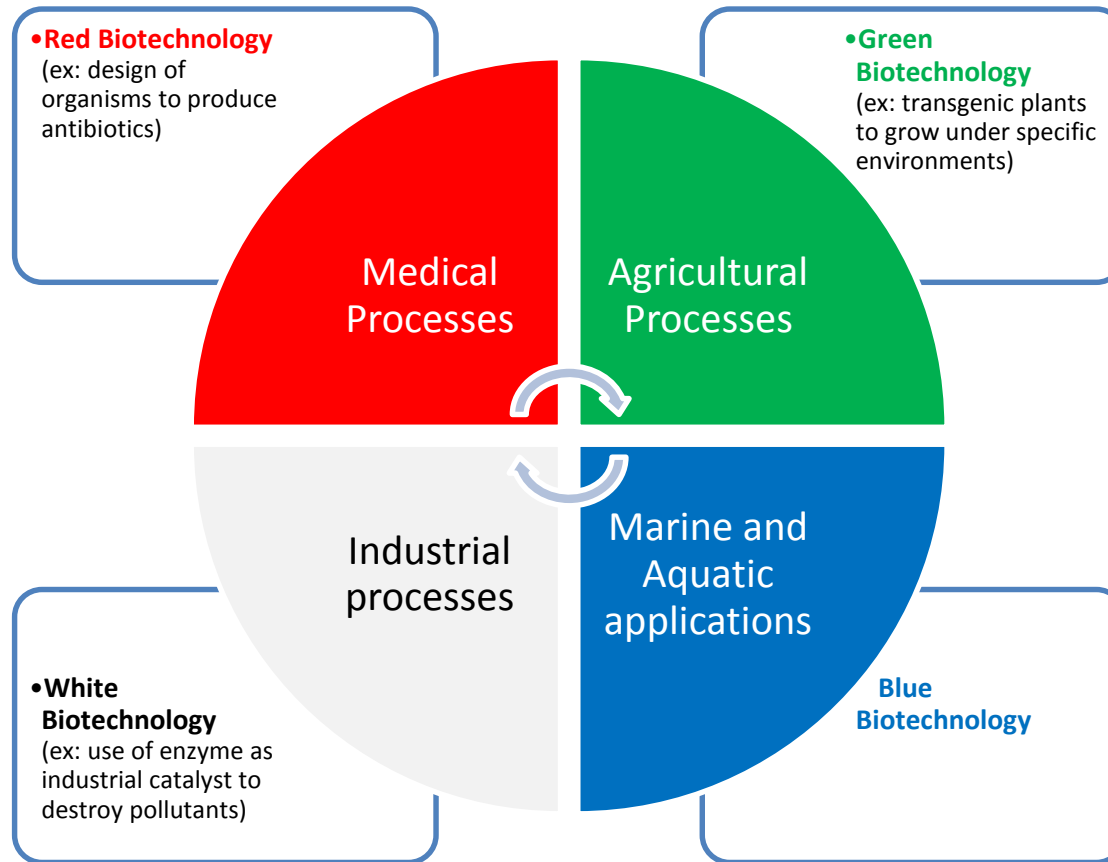
Courtesy of M. Luna



Source: Philips Medical Systems

<http://www.nanowerk.com/spotlight/spotid=3938.php>

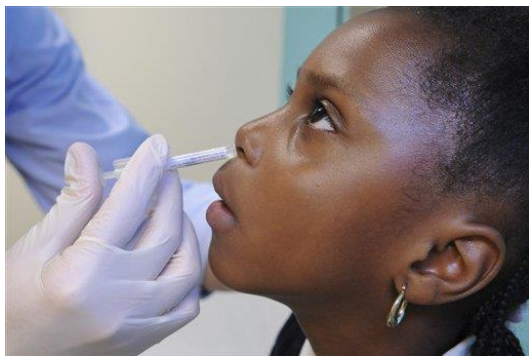
Different application sectors



Nanobiotechnology Nanomedicine



NANOVACCINES Alternative solutions



DEVICES

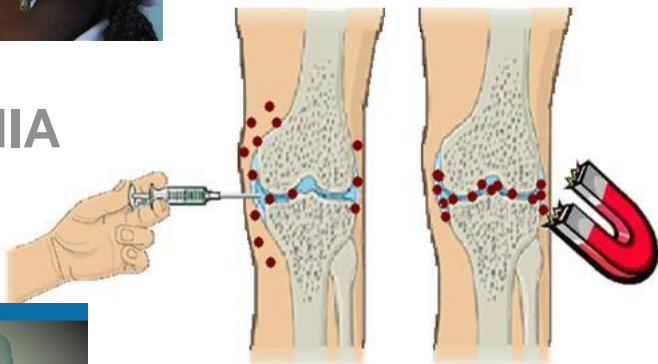


Catheters ↘ infections

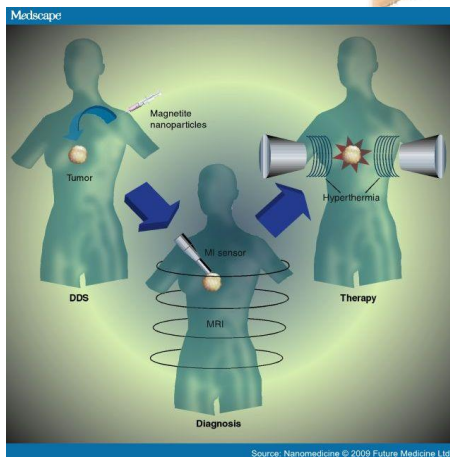
Devices ↘ size

...

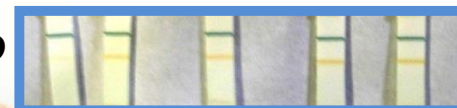
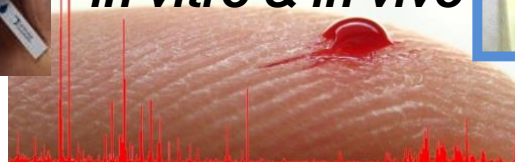
HYPERTHERMIA Photodynamic or localized



CONTRAST AGENTS



DIAGNOSTIC *in vitro & in vivo*



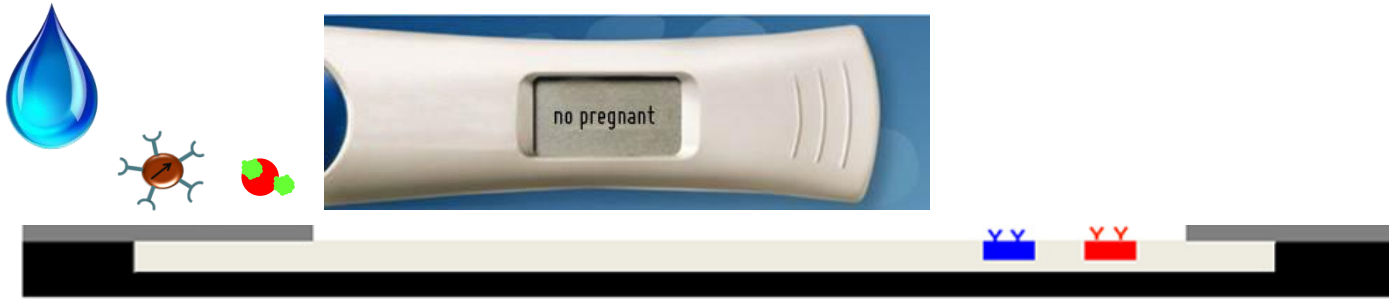
Nanobiotechnology

Examples of application: Diagnostics





LATERAL FLOW BIOSENSORS



Negative Test

Control Line
Test line



Positive Test

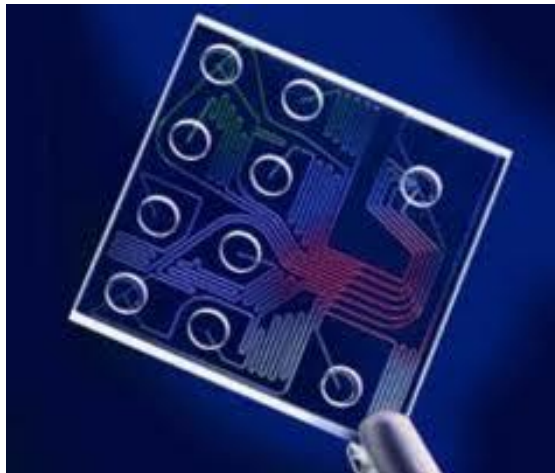
Control Line
Test Line

During the pregnancy a hormone is produced, the human chorionic gonadotropin

Examples of application: Diagnostics



- ✓ Better sensitivity
- ✓ Multi-detection
- ✓ More cost-effective
- ✓ Miniaturization (“lab-on-a-chip”)





Large increase of surface area:
↑ storage capacity

Multifunctional platform

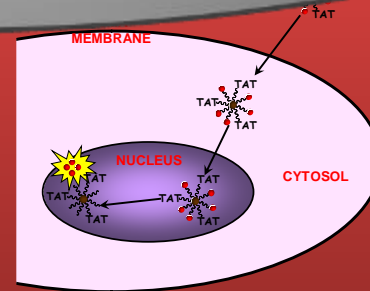
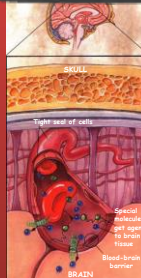
EFFICIENCY AND SELECTIVITY IMPROVED



↓ SIDE EFFECTS

Cross through
biological barriers

↑ drug solubility



Nanobiotechnology

Examples of application: Food



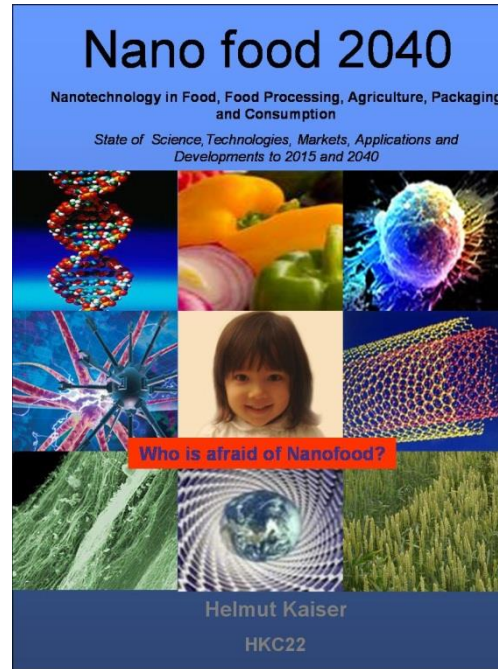
1.- Food

2.- Processing

3.- Packaged / Canned

4.- Transport

5.- Agri-aqua-culture



Alternative solutions



Interactive Food



Security-Quality

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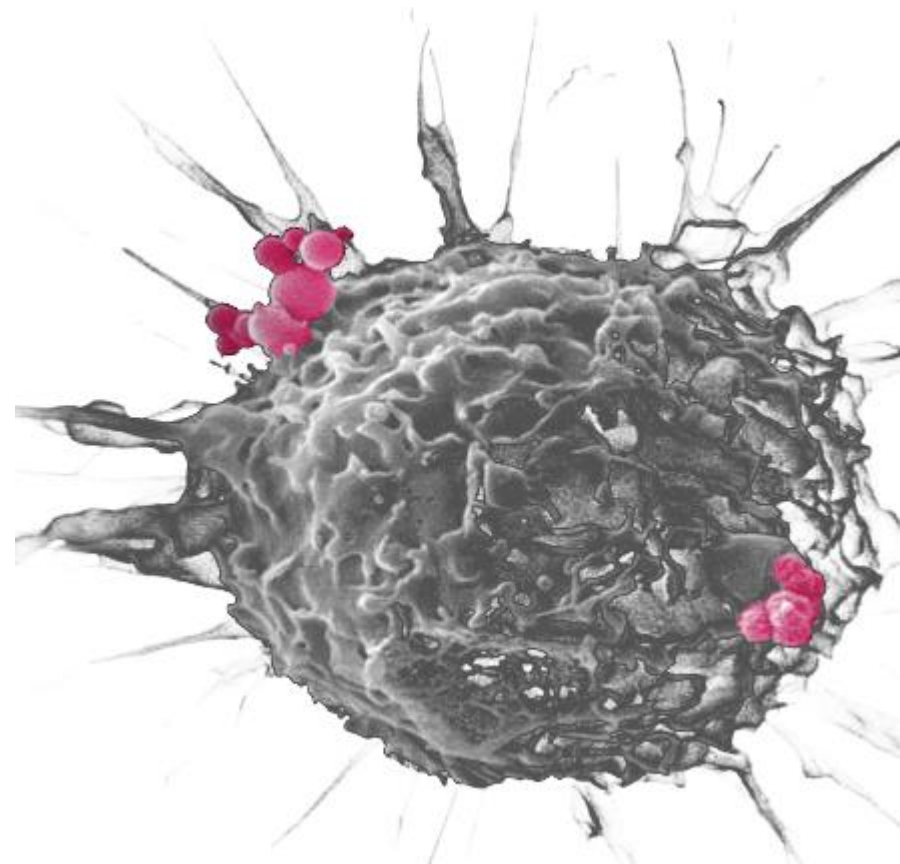
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7- R&D Activity



Headquarters



- **Headquarters in Zaragoza**

Edificio Cero Emisiones

Avenida de la Autonomía 7

50003 Zaragoza , Spain



- **Headquarters in Vigo**

Plaza de Fernando

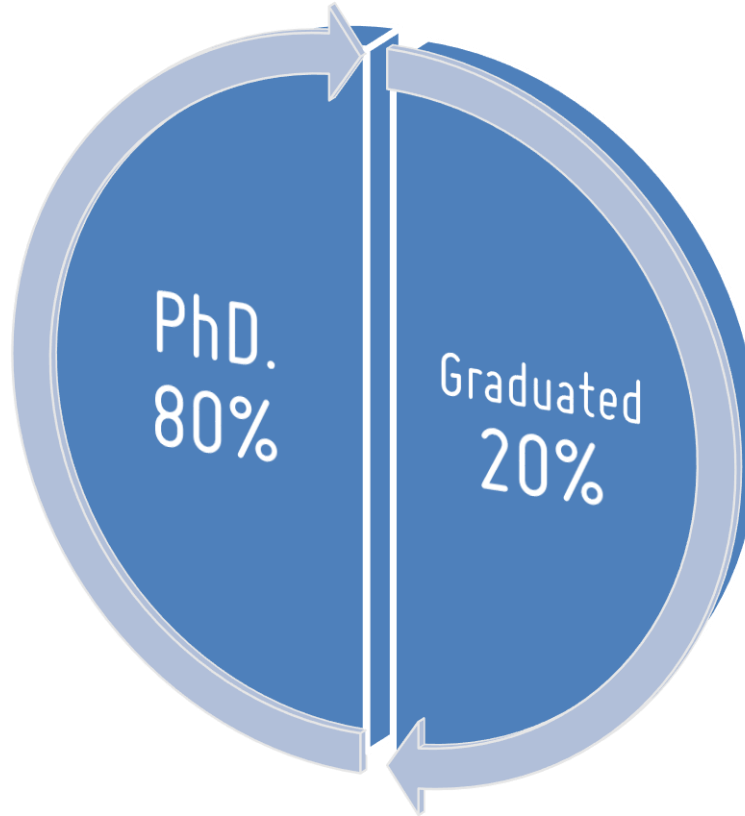
Conde Montero Ríos 9

36201 Vigo, Pontevedra, Spain





- R&D Department



Our Added Value



- State-of-the-art **Laboratories**.
- Internationally recognized **Human Resources**.
- Standardized **Protocols**.
- **“Know-how”** to perform proper supervision, advice and validation of different nanosystems.
- **Flexible Business Model**.
- Participating in research or on demand **Projects**.
- **Licensing**.
- **Customer-Supplier** relationships.
- Headquarters and Laboratories in **Vigo** and **Zaragoza**.

Products and Services



nitzipper



nitcharacter



nitbiosafe

- Development and licensing of new projects (tailor-made projects)
 - Validation and advising services

Active in R&D projects



- ❧ **COLIVAC:** Development of new technologies for E.coli vaccine using nanobiotechnology (Interconnecta).
- ❧ **HelloKIT:** Development of a universal kit for remote controlled drug release by magnetic hyperthermia in oncology applications.(Impacto).

PENDING:

- ❧ 1 Large European FP7
 - ❧ Nanotherapeutics for antibiotic resistant emerging bacterial pathogens.
- ❧ 1 InnovAragón
 - ❧ Improvement of immunoassays techniques through our NITZIPPER technology.
- ❧ 2 Interconnecta projects (national)
 - ❧ Food industry: Development of a biosensor to detect animal stress level + development of an intelligent packaging with nanotechnology.
 - ❧ Environment industry: Development of a biosensor to detect pollutants in water.

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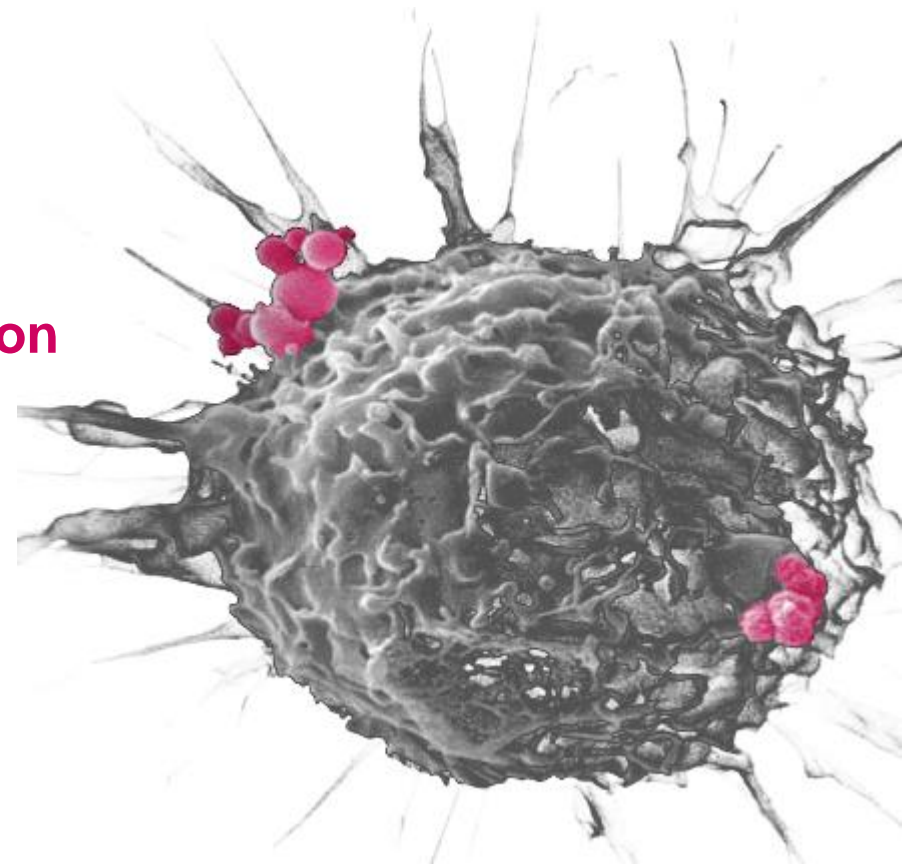
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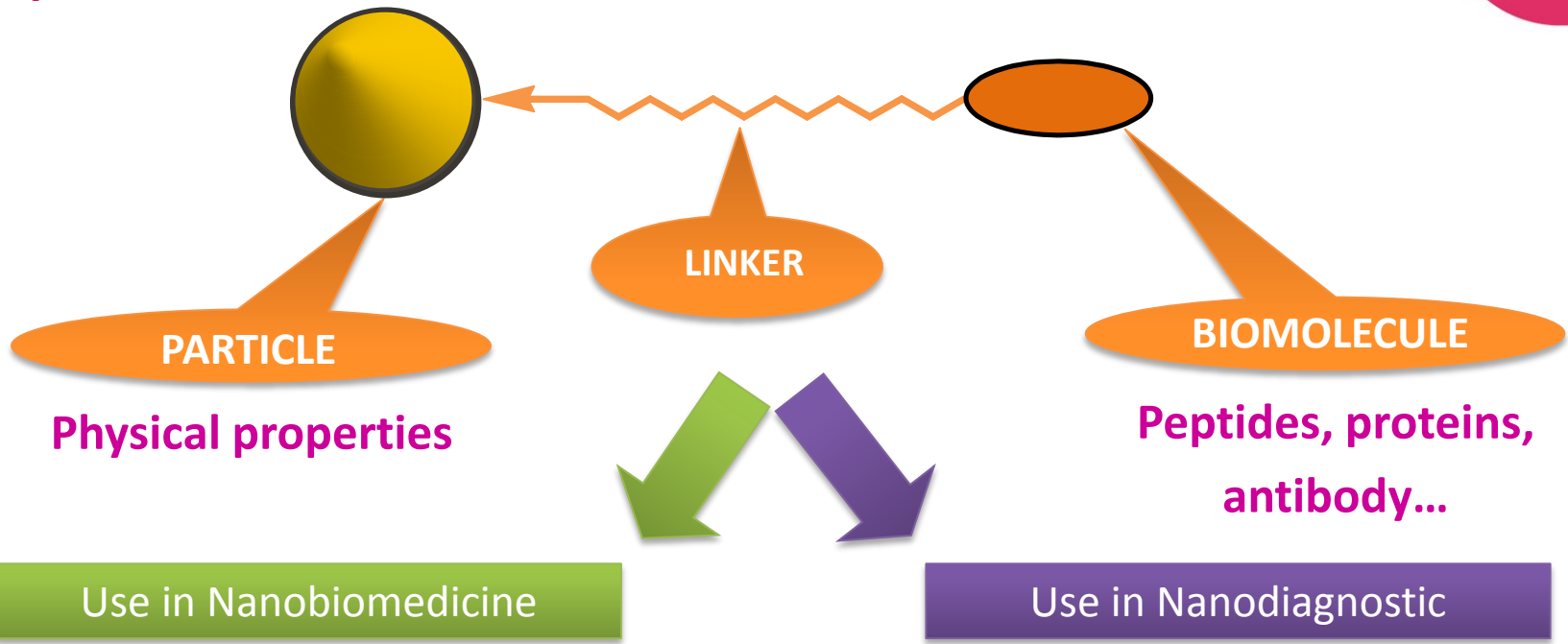
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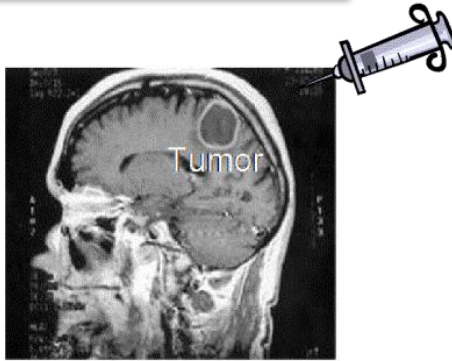




Important matters: Functionalization



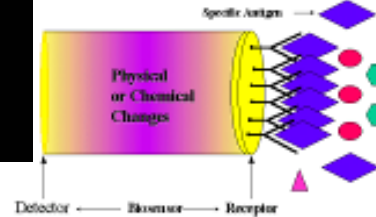
Drug Delivery



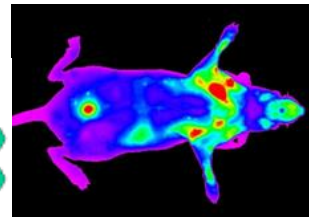
Hyperthermia



MRI



Biosensors

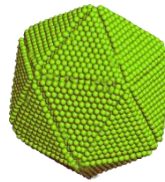


Fluorescent Tomography



Important matters: Functionalization

NanoDrug



NP without functionalization:

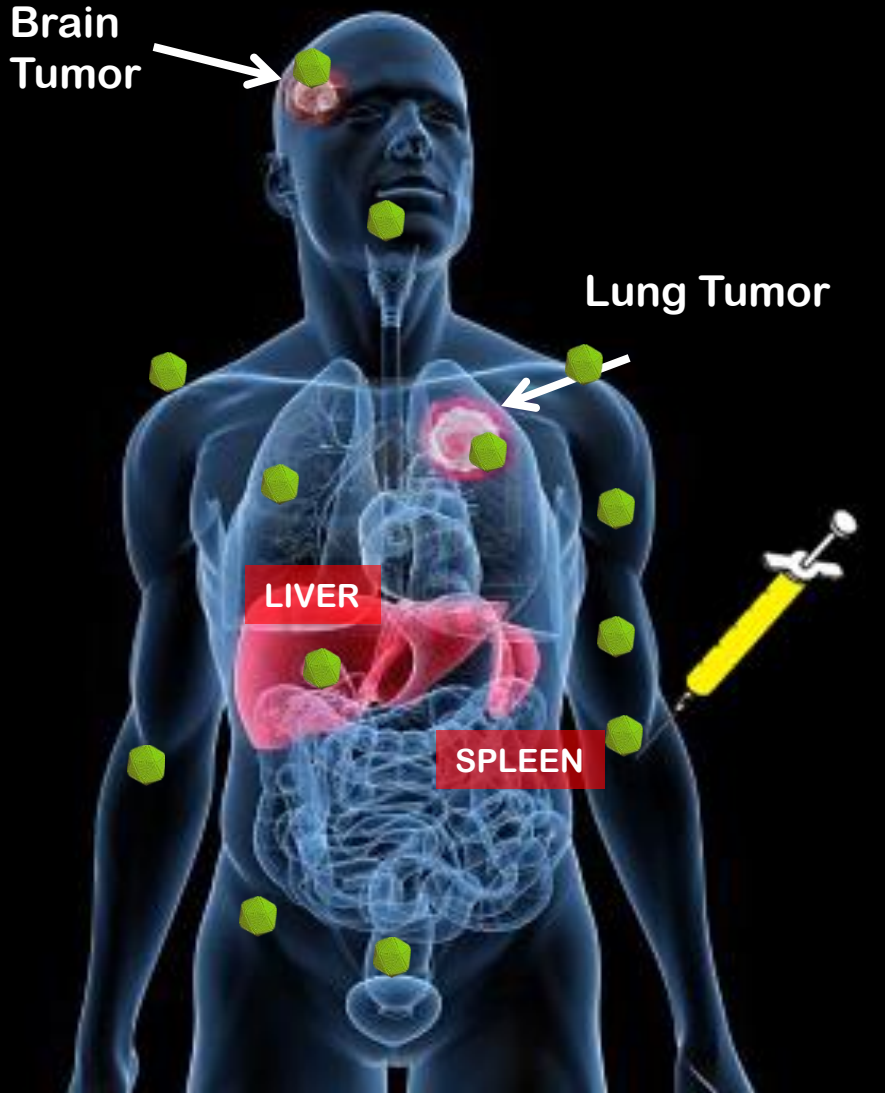
- ✓ non-specific distribution
- ✓ recognized by the immune system
- ✓ liver & spleen accumulation

LOW SELECTIVITY

= side effects

= ex. chemotherapy

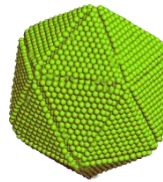
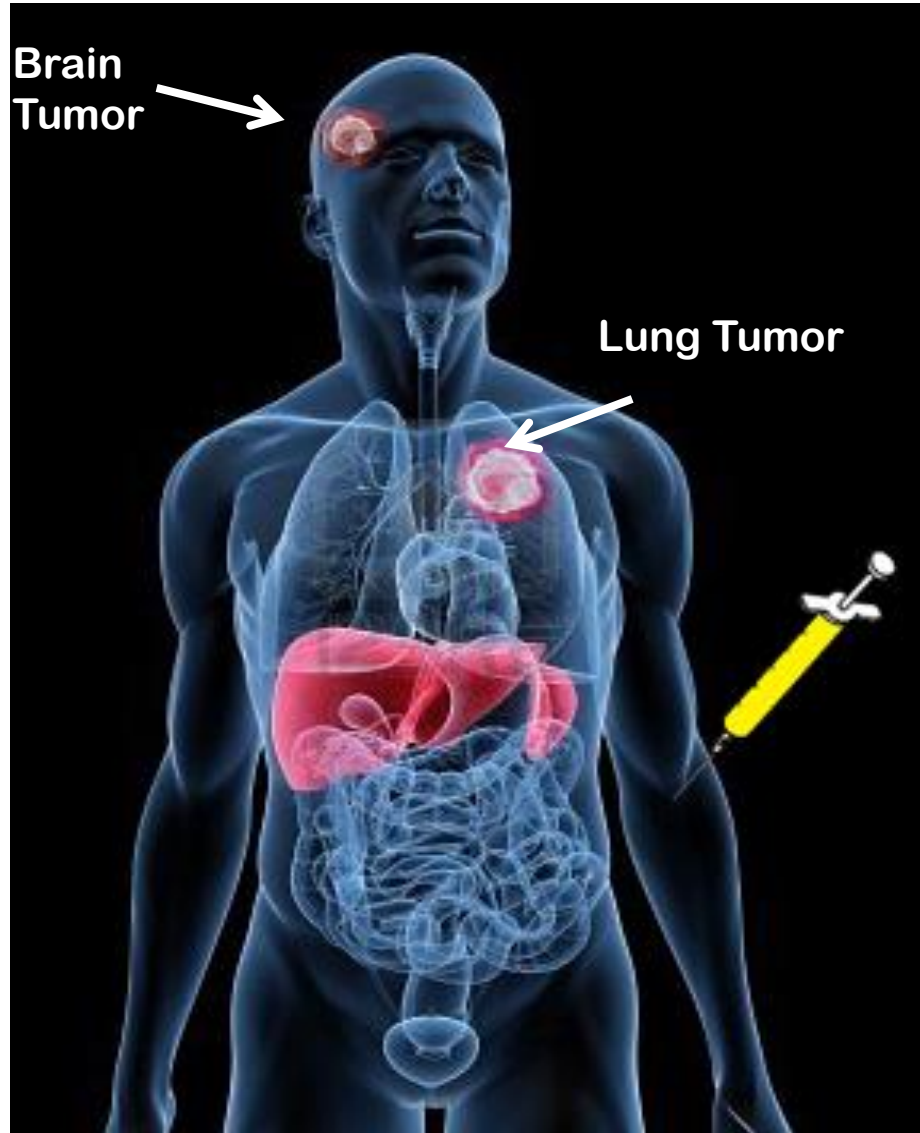
= ex. radiotherapy





Important matters: Functionalization

NanoDrug



NP without functionalization:

- ✓ non-specific distribution
- ✓ recognized by the immune system
- ✓ liver & spleen accumulation



NP@tumor-vectorization

- ✓ tumor accumulation
- ✓ non-immunogenics
- ✓ selectivity type tumor



HIGH SELECTIVITY

= fewer doses

= fewer side effects

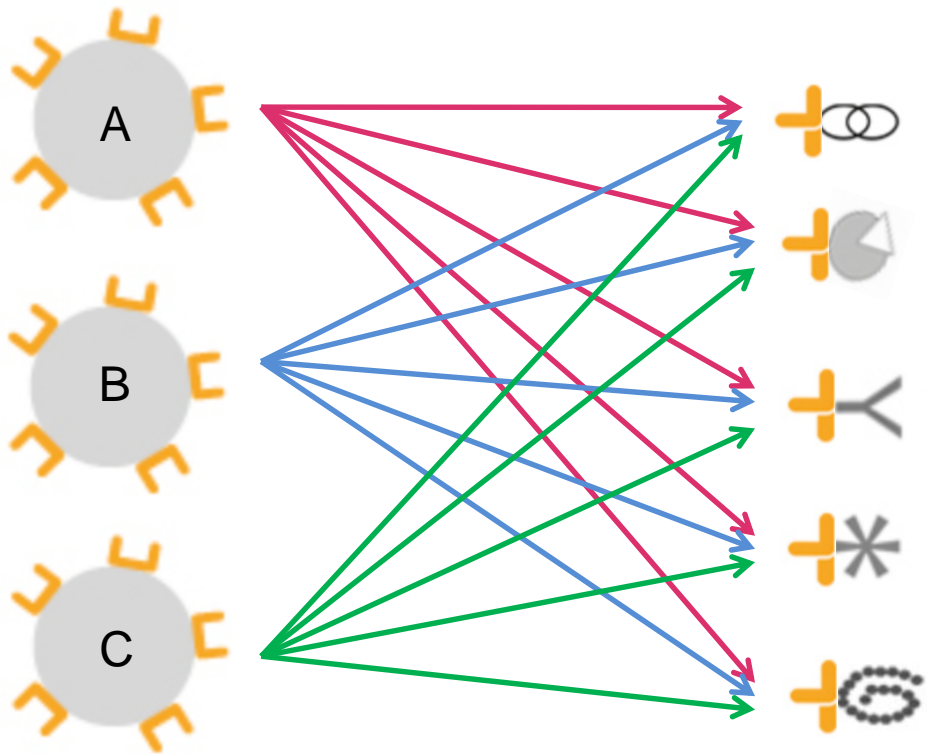
= less resistance



- ❏ Conjugation processes depend on the variety of micro/nanostructures and biomolecules used;
- ❏ Bioconjugation protocols need to respect the orientation of biomolecules on the surface (unresolved problem);
- ❏ No universal, easy, quick bioconjugation protocol;
- ❏ Tailor-made projects required to optimize complex binding protocols;
- ❏ Experienced personnel needed;
- ❏ Time consuming and expensive solutions.

That is the reason why we have created

nitzipper®



Many particles and biomolecules

Easy and Quick

Multifunctionalization

Inexpensive

Infinite applications

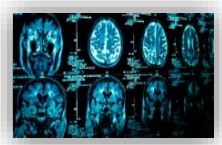
Adapts to your needs

Particles

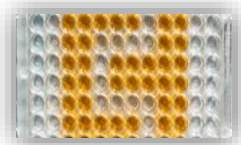
Biomolecules/Drugs

Plug&Play solution – Single Step

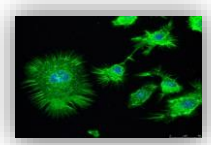
The simplest, quickest and most versatile Bioconjugation solution



Contrast agents



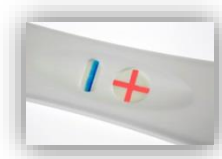
ELISA



Immunofluorescence



Nanovaccines



Biosensing

Versatile

Better results

Simplicity

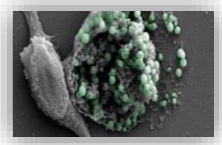
Stable

Reduce costs

Saves Time

Efficiency

Infinite applications
Develop your own one with nitzipper®



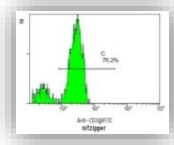
Magnetic Hyperthermia



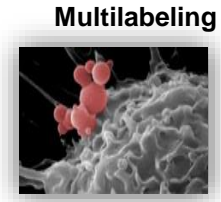
Magnetic Separation



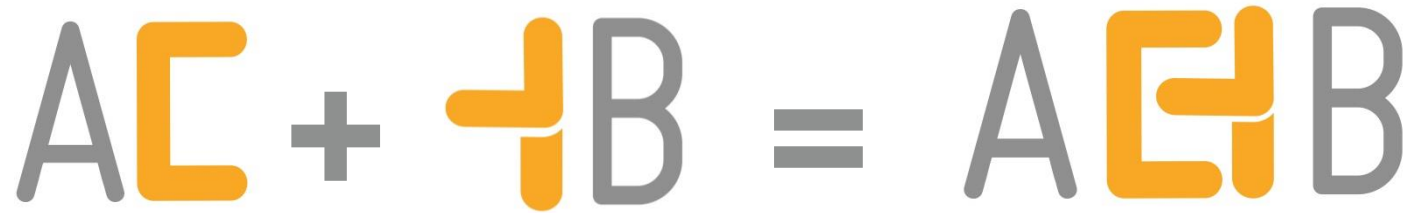
Drug Delivery



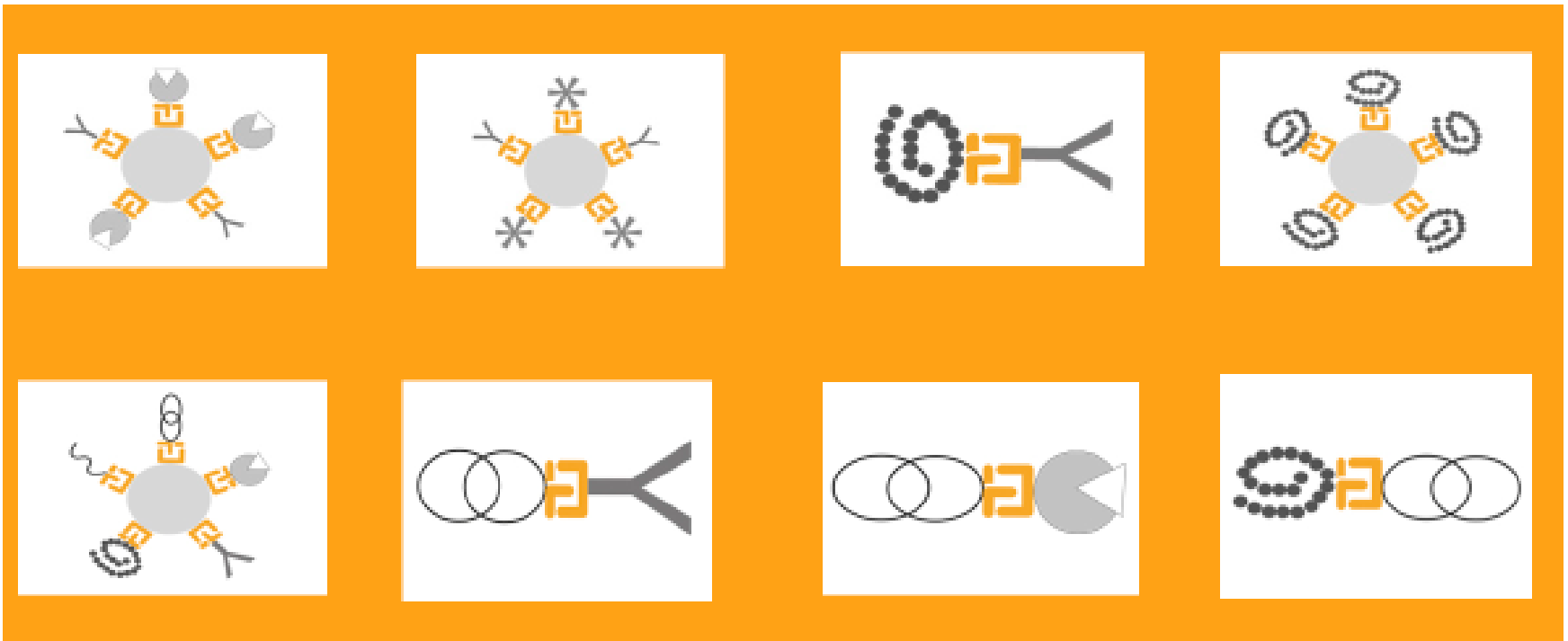
Flow Cytometry



Multilabeling



MULTIPLE SOLUTIONS/APPLICATIONS

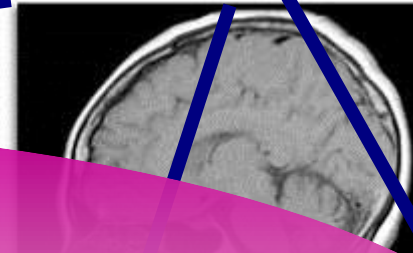




Example



Biomolecule 1
(cross BBB)

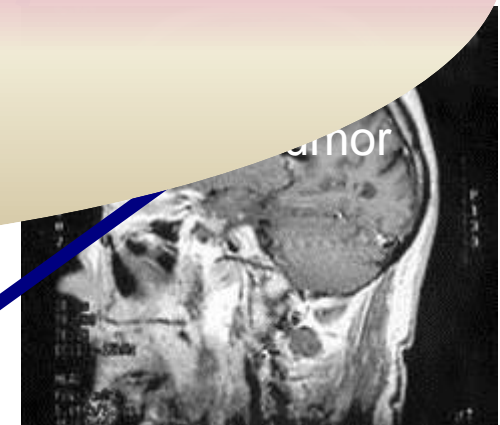


DRUGS MORE EFFICIENT AND SELECTIVE

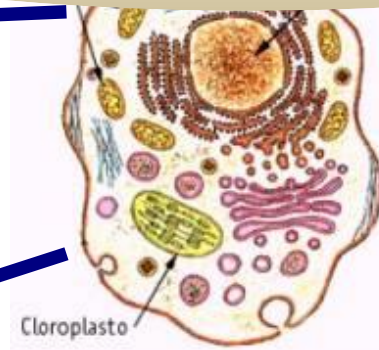


Biomolecule 2
(target tumoral cells)

↓ SIDE EFFECTS



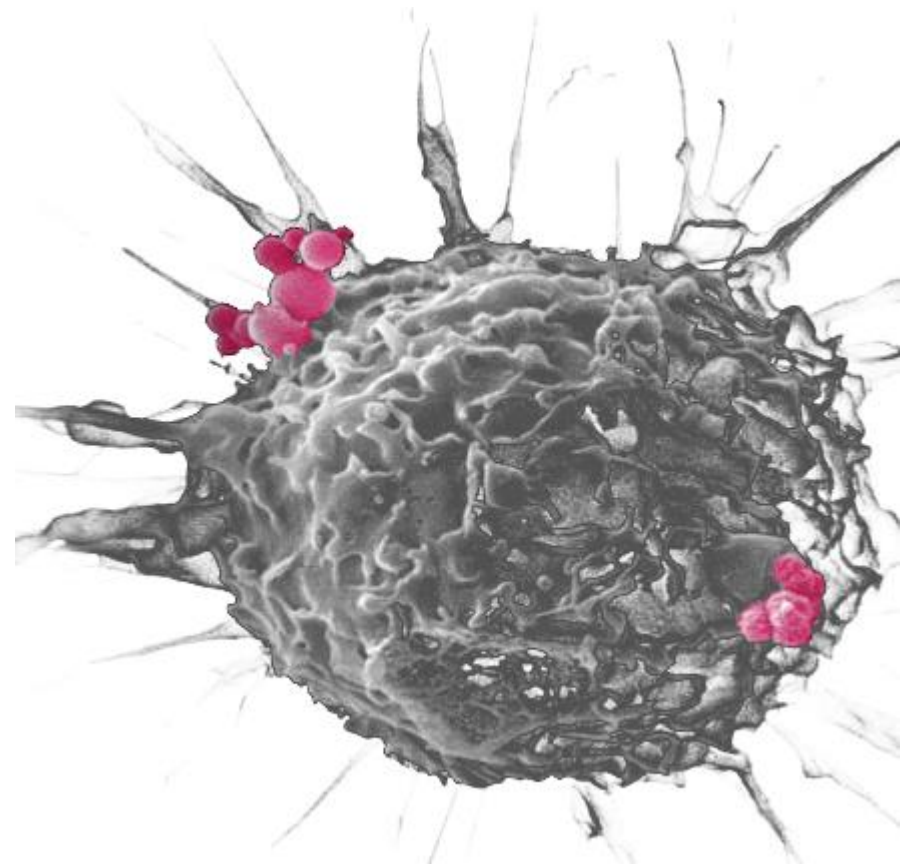
Biomolecule 5
(DNA intercalator)
!!!CELL DEATH!!!



Biomolecule 4
(nuclear translocation)

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- 5- NITBIOSAFE
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- 7- R&D Activity





Important matters: Reproducibility

- ❧ Large variability in manufacturing methods
- ❧ Large variability in raw materials used
- ❧ No standard, systematic and rigorous method to evaluate the variability between synthesized batches

To be able to compare the results obtained

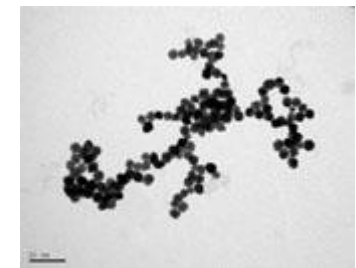
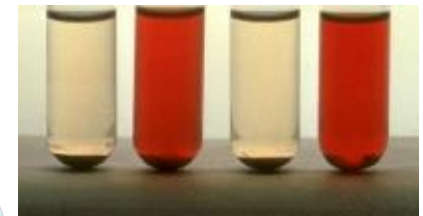
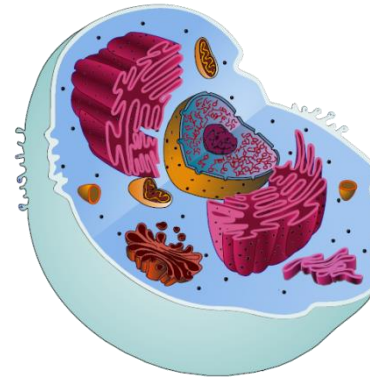
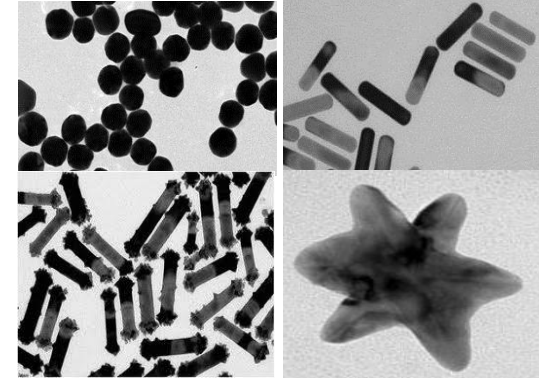


Studies that must be done



- Physico-chemical characteristics:

- Size
- Composition
- Surface charge
- Shape
- Stability
- ...



NITCHARACTER

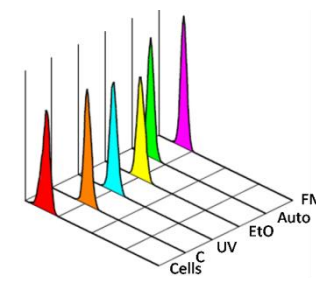
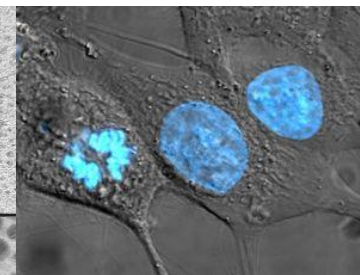
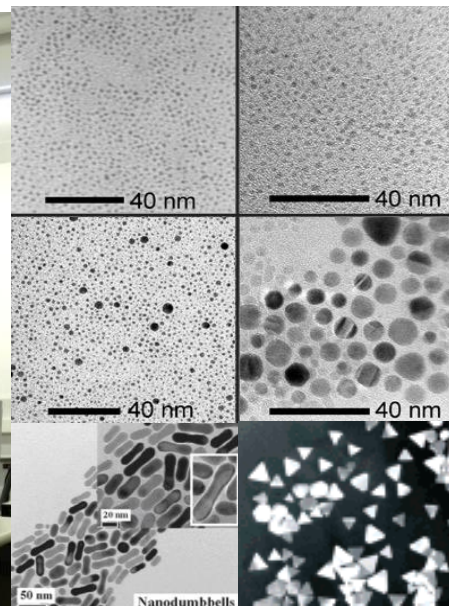
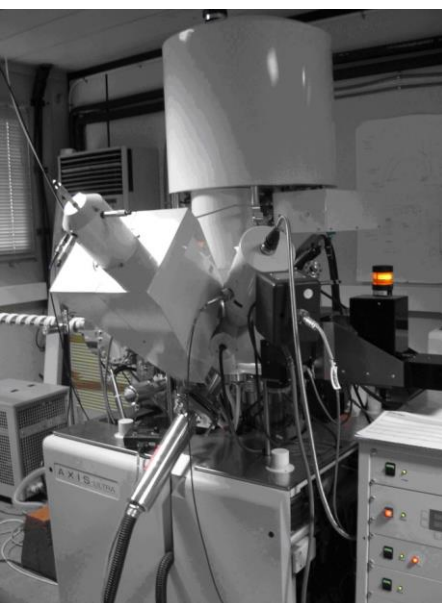
Physico-Chemical Characterization



- 1) Ensure reproducibility between batches of NPs
- 2) Ensure customer confidence in the product
- 3) Understand physicochemical properties of NPs
- 4) Improve synthesis design
- 5) Essential prior to *in vitro* and *in vivo* use



www.nitcharacter.com





Physicochemical Characterization Analysis Services y Advising:

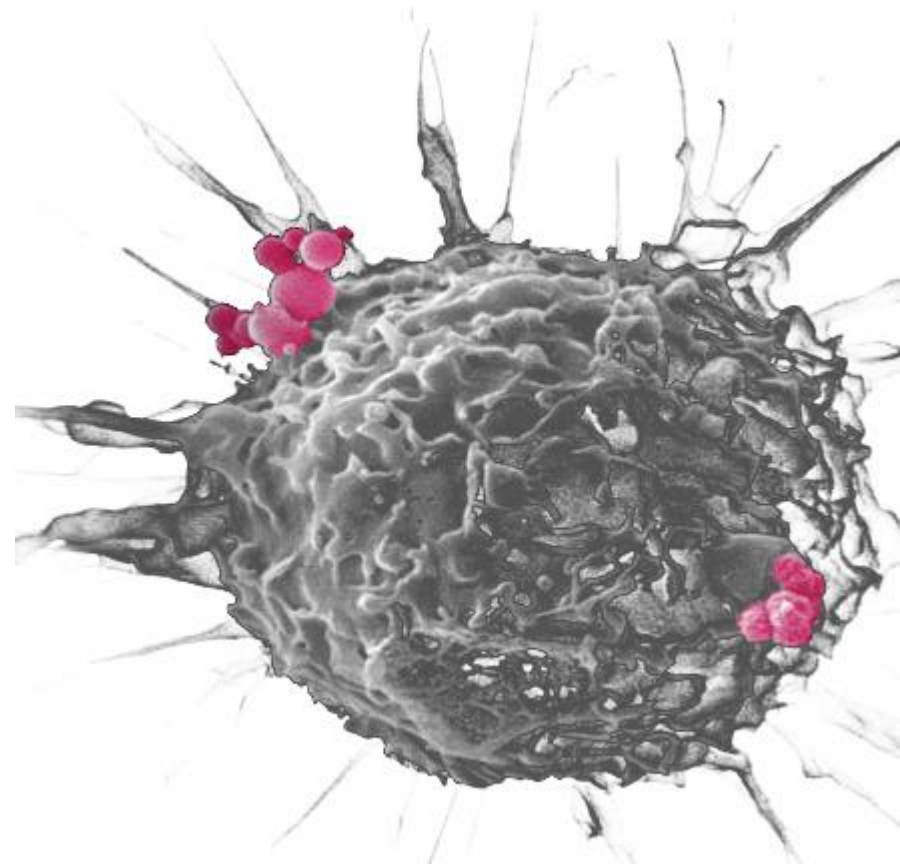
- 🔗 Size and size distribution (TEM; SEM; DLS);
- 🔗 Particle morphological analysis (TEM; SEM);
- 🔗 Surface charge determination (Zeta potential);
- 🔗 Chemical / Structural composition (EDX; Elemental Analysis; ICP; FTIR; XPS; RMN; TGA; etc);
- 🔗 Particle intrinsic properties analysis (SQUID; UV-vis and fluorescence spectrophotometry, etc).

NOT JUST FOR BIO APPLICATIONS

→ ALL SECTORS

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Important matters: Environment



**Risky
Materials
??**

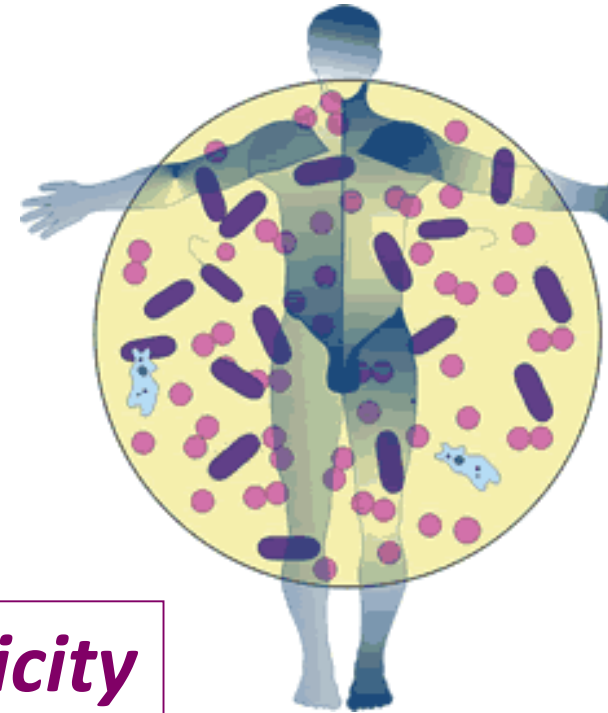
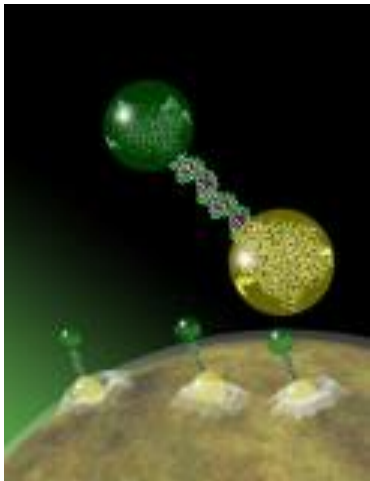
*Nanotechnology
can help but can
also damage the
environment*

Arrival of Nps to rivers / seas / trophic level
Human toxicity



Entrance of Nps

Intentional
Accidental



Studies are required

Biocompatibility- Toxicity
Sterility
Immunogenicity



NITBIOSAFE

Biological (*in vitro* & *in vivo*) Characterization



nitbiosafe

Testing the safety of your nanoworld

Nanotoxicity (organism, environment)

Nanosecurity (*in vitro* / *in vivo*)

www.nitbiosafe.com

- ☞ **Safe** and **Rational** use of nanomaterials in products throughout their **complete life-cycle**
- ☞ Quantification of risk and environmental impact
- ☞ Be prepared to the future regulatory requirements
- ☞ **ECO- friendly** aspect important for clients

NITBIOSAFE

Biological (*in vitro* & *in vivo*) Characterization



nitbiosafe

Testing the safety of your nanoworld

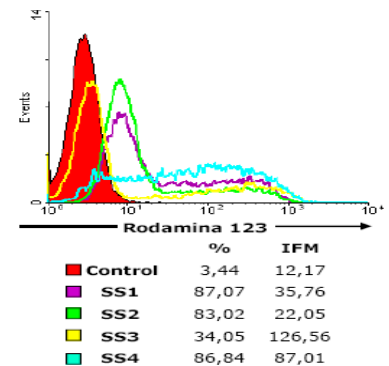
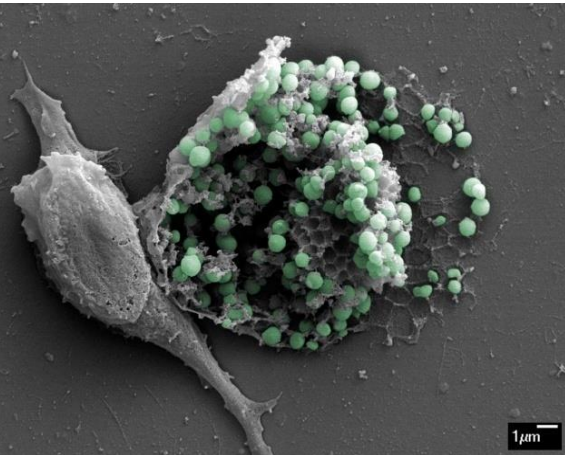
www.nitbiosafe.com

Biological (*in vitro* & *in vivo*)
Characterization Analysis Services of
nanomaterials:

- Biocompatibility Studies
- Immunological Studies
- Hematological Studies
- Efficacy

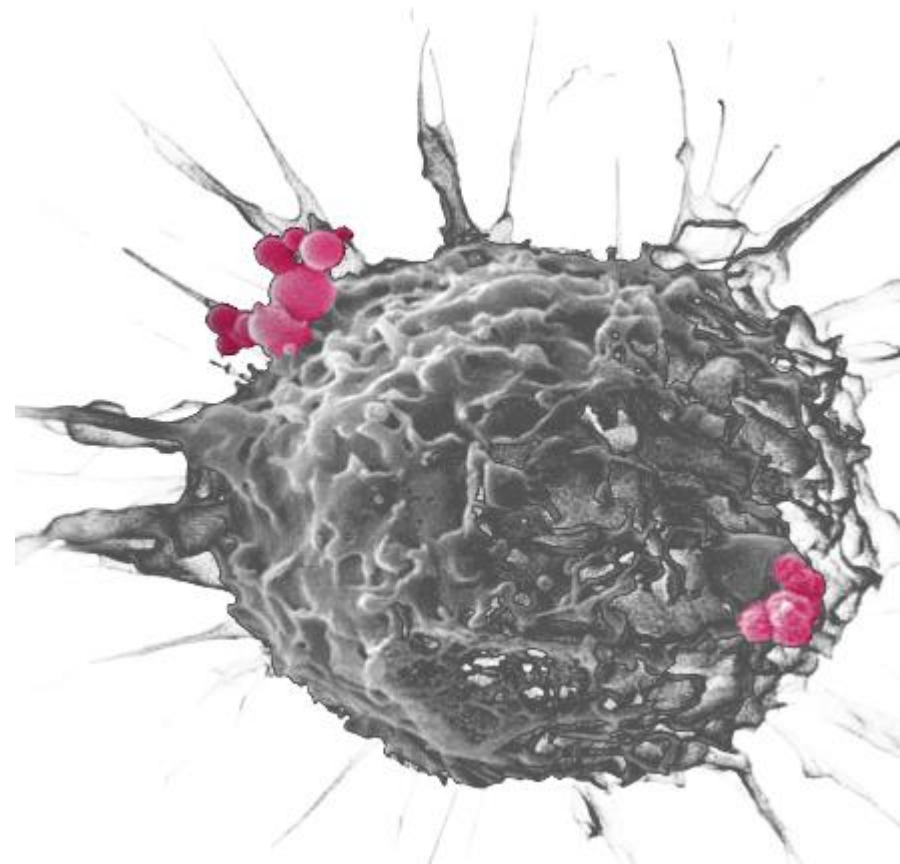
**NOT JUST FOR BIO
APPLICATIONS**

→ ALL SECTORS



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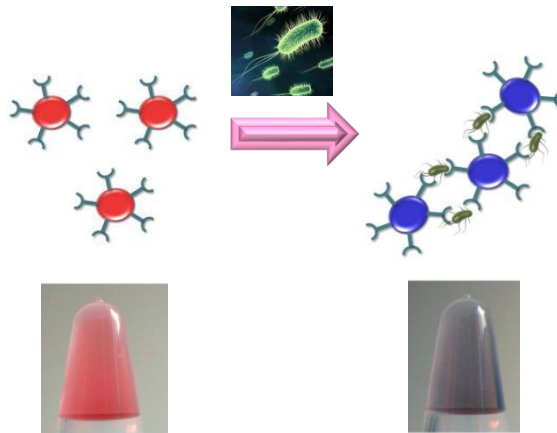
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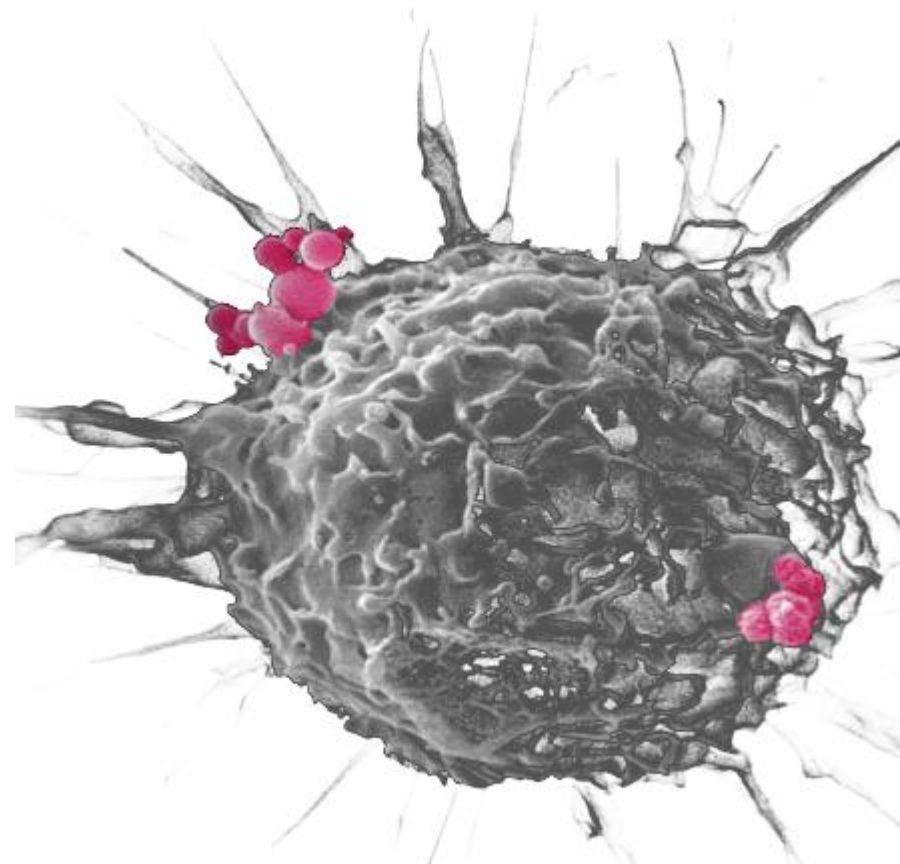
mi Licensing and development of Biosensing proprietary technologies
(ex: colorimetric biosensor)

→ in collaboration with other institutes



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NANOIMMUNOTECH, your Reliable and Highly-qualified partner in Nanotechnology

- Actively involved in R&D projects (regional, national, European, etc)
- Developing tailor-made projects for our customers
- Do you want to introduce the “nano” in you business? → CONTACT US and we will help you



We are waiting for collaborating with YOU!



nanoimmunotech
global solutions in nanobiotechnology

HEADQUARTERS:

VIGO: Plaza de Fernando Conde Montero Ríos 9.
36201 Vigo (Pontevedra), España.

ZARAGOZA: Edificio Cero Emisiones. Avenida de la Autonomía 7.
50003 Zaragoza, España.

Contact:

info@nanoimmunotech.es
Phone: +34 976 971 856

www.nanoimmunotech.eu

