



Universidad
Nacional
de San Martín

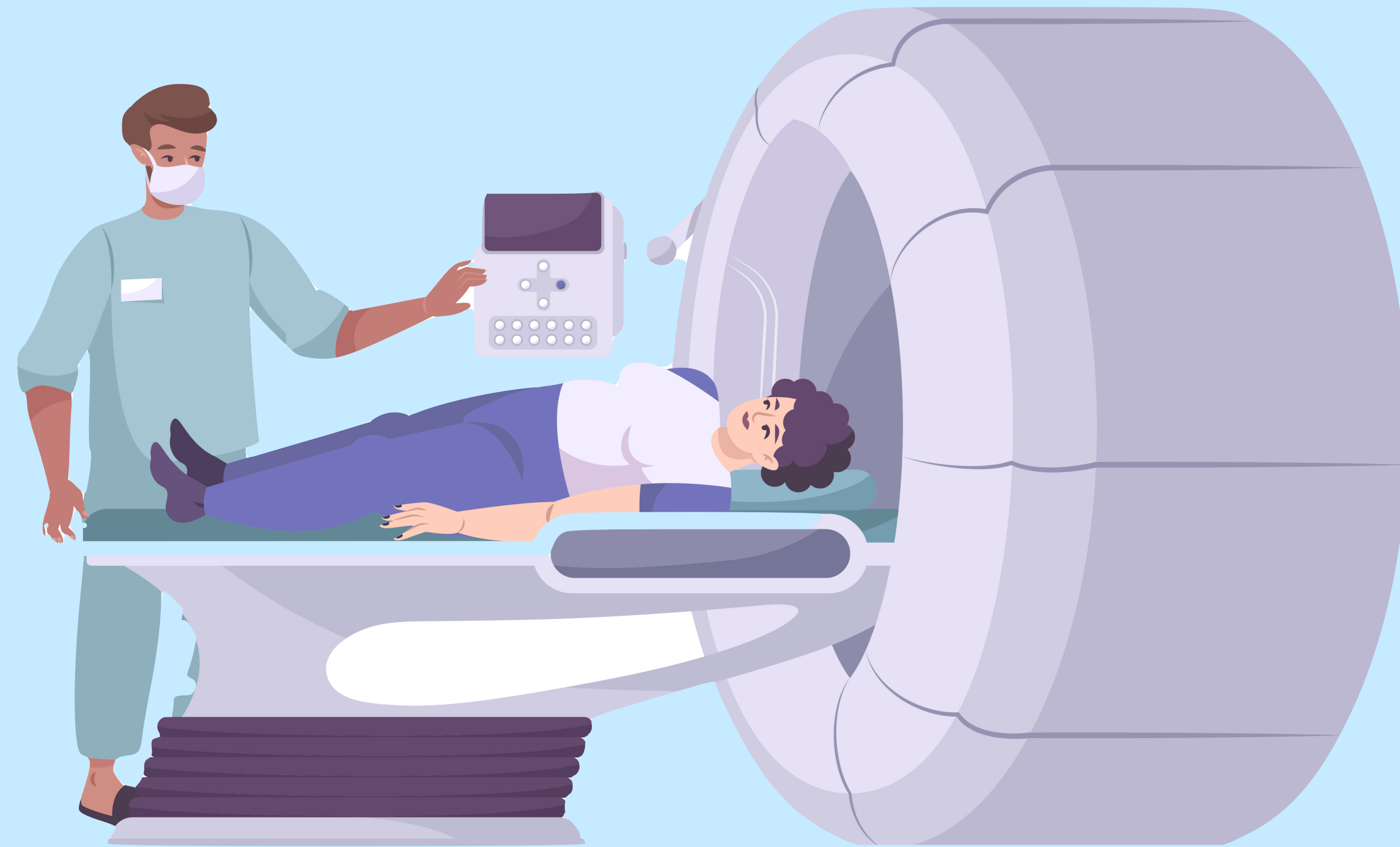
An illustration of two scientists in white lab coats. The scientist on the left is a woman with dark hair, wearing a teal top and grey pants. The scientist on the right is a man with dark hair, wearing a light green top and grey pants. They are standing on either side of a large, light blue puzzle piece that is part of a larger, faint puzzle in the background. The puzzle pieces are in shades of blue and green.

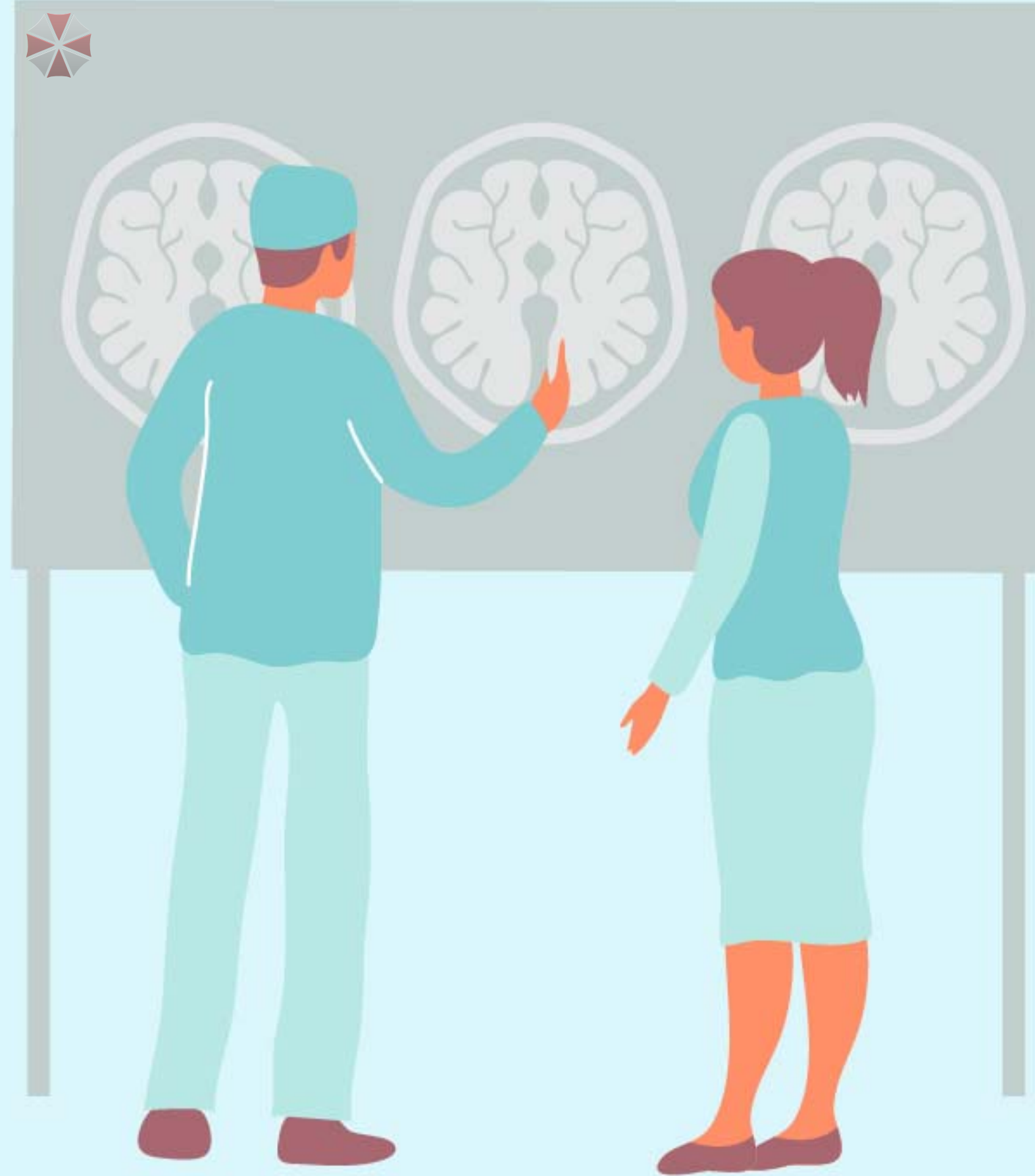
Dall'immagine diagnostica al paziente

evoluzione di un trattamento BNCT

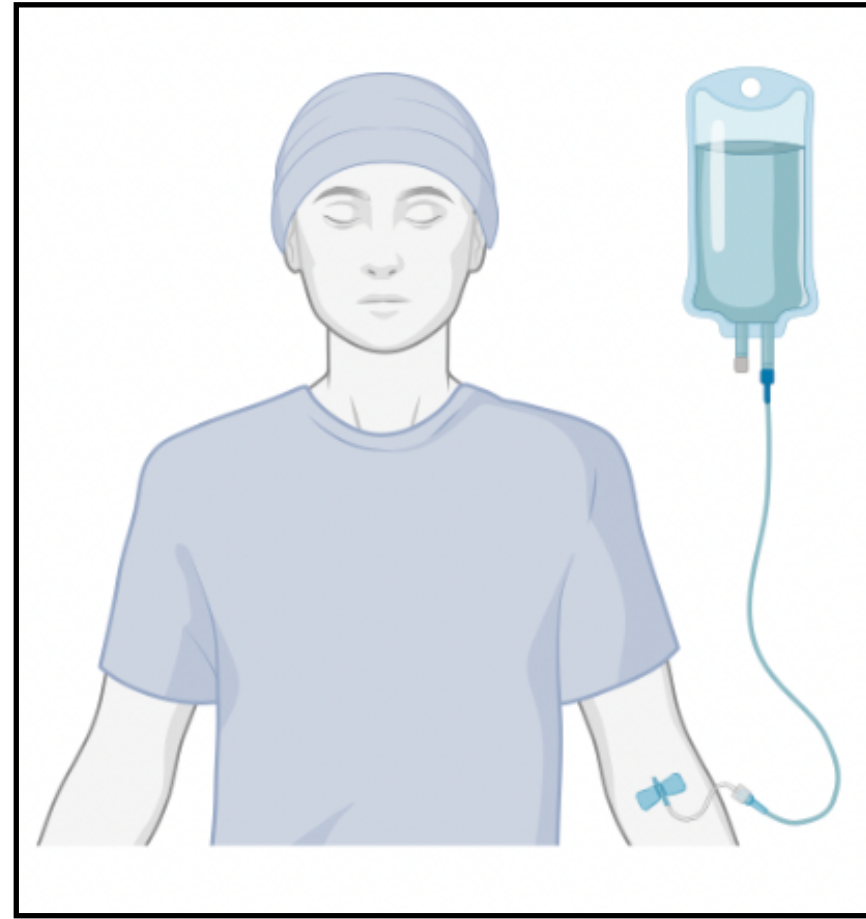
Setareh Fatemi, Barbara Marcaccio, Ian Postuma

27.04.2023





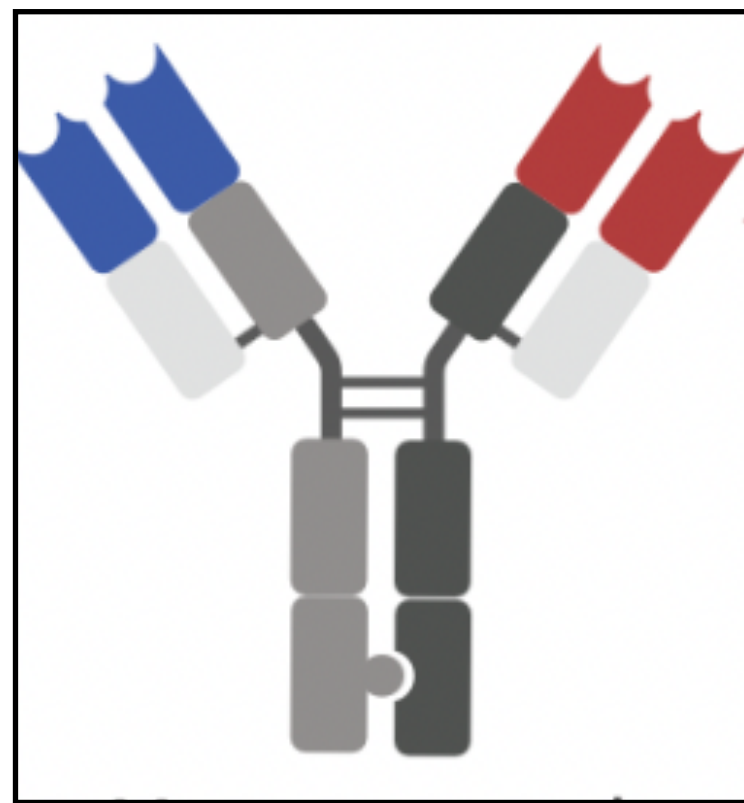
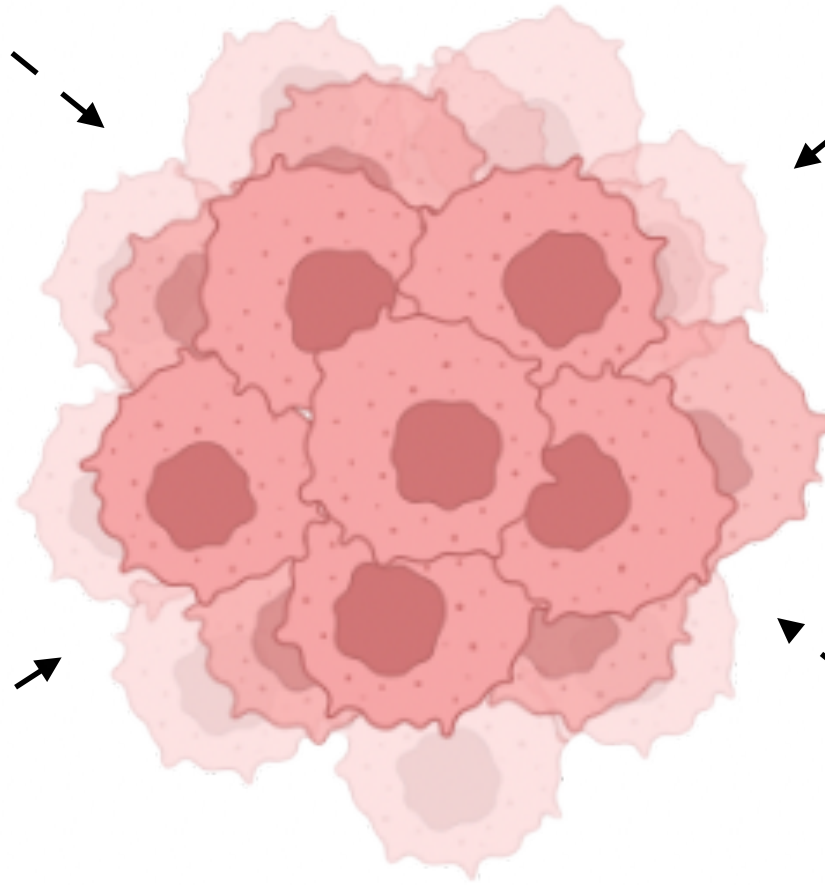




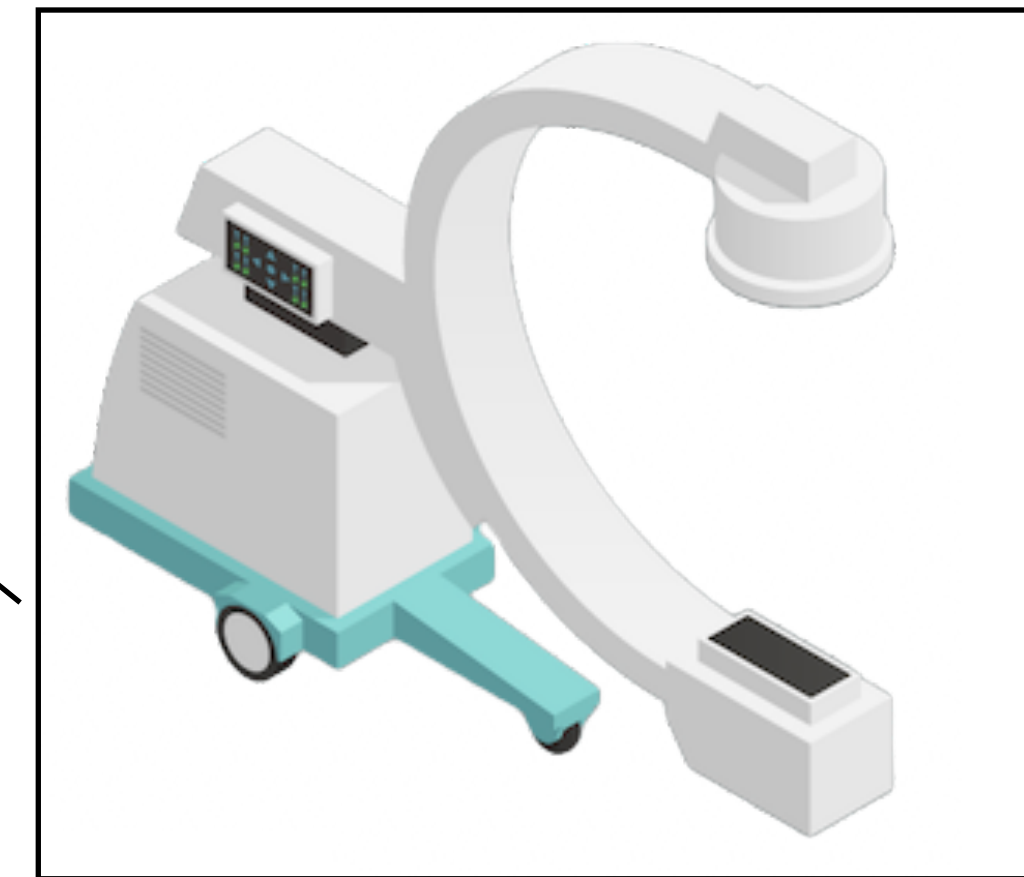
Chemioterapia



Chirurgia



Immunoterapia



Radioterapia

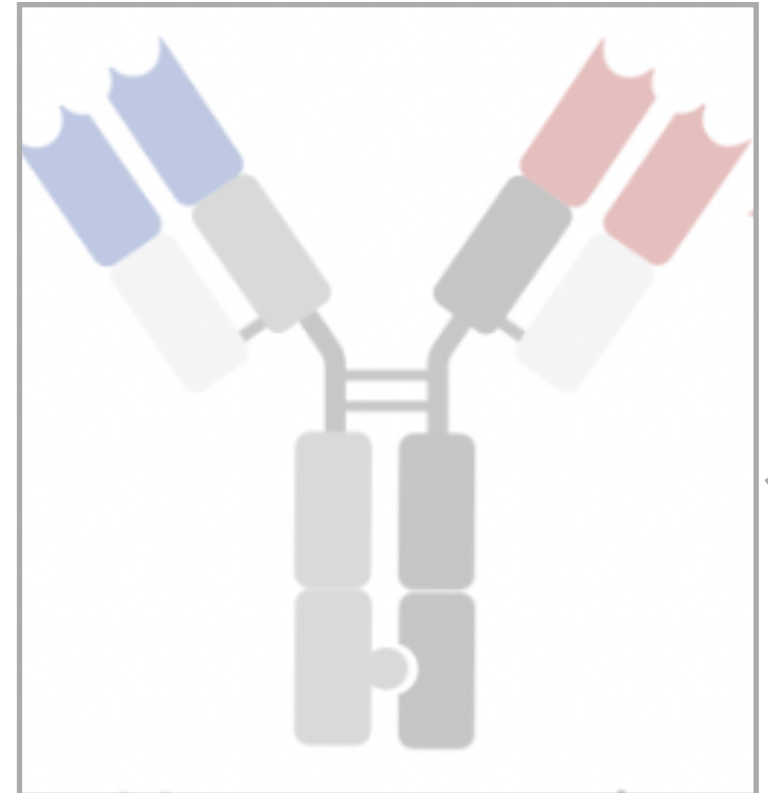
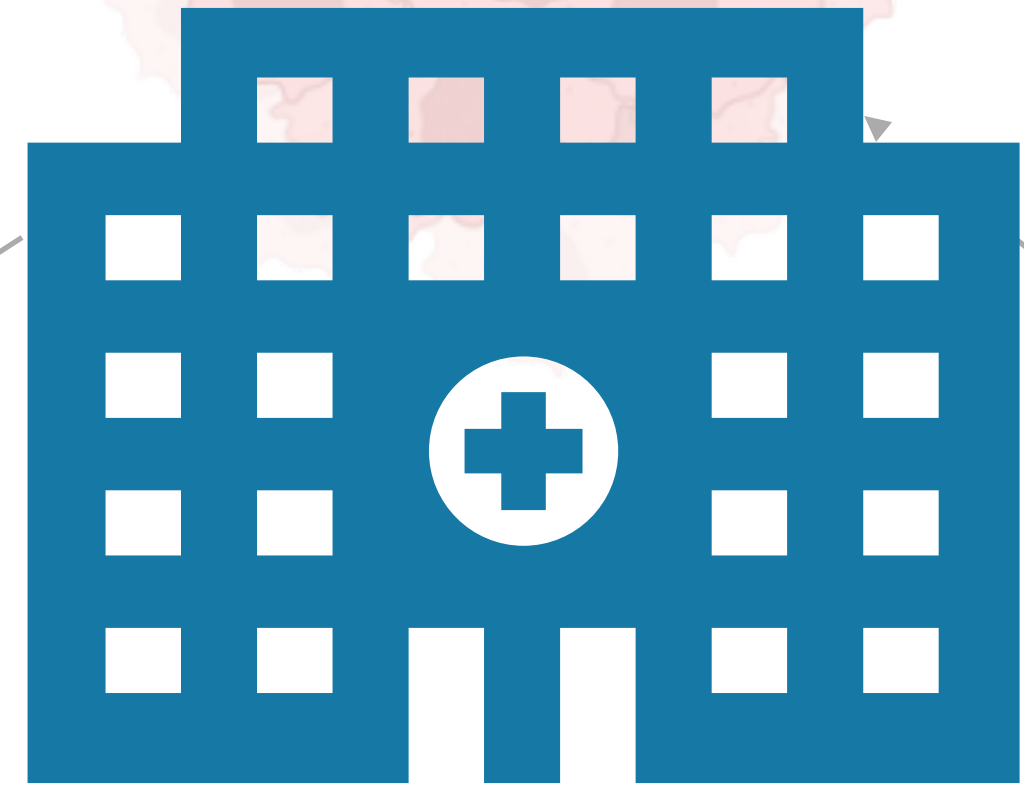
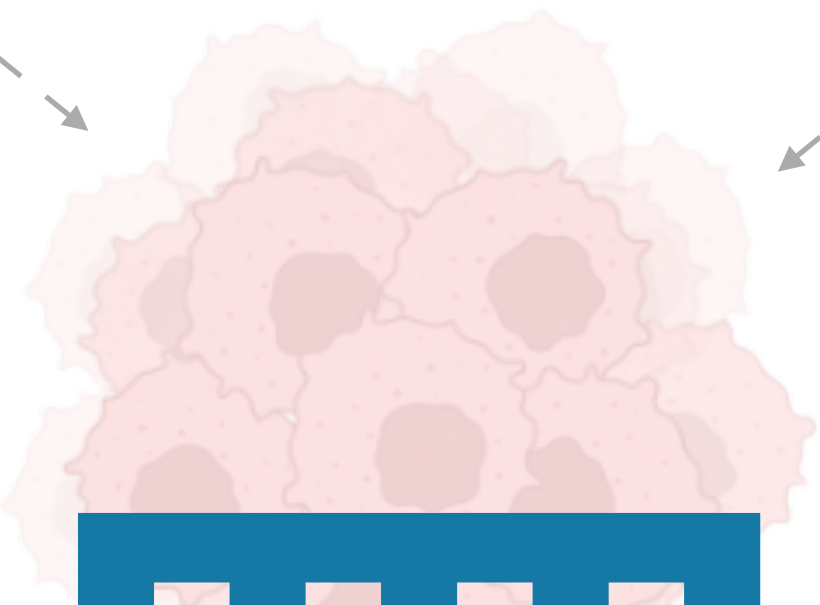
Boron Neutron Capture Therapy



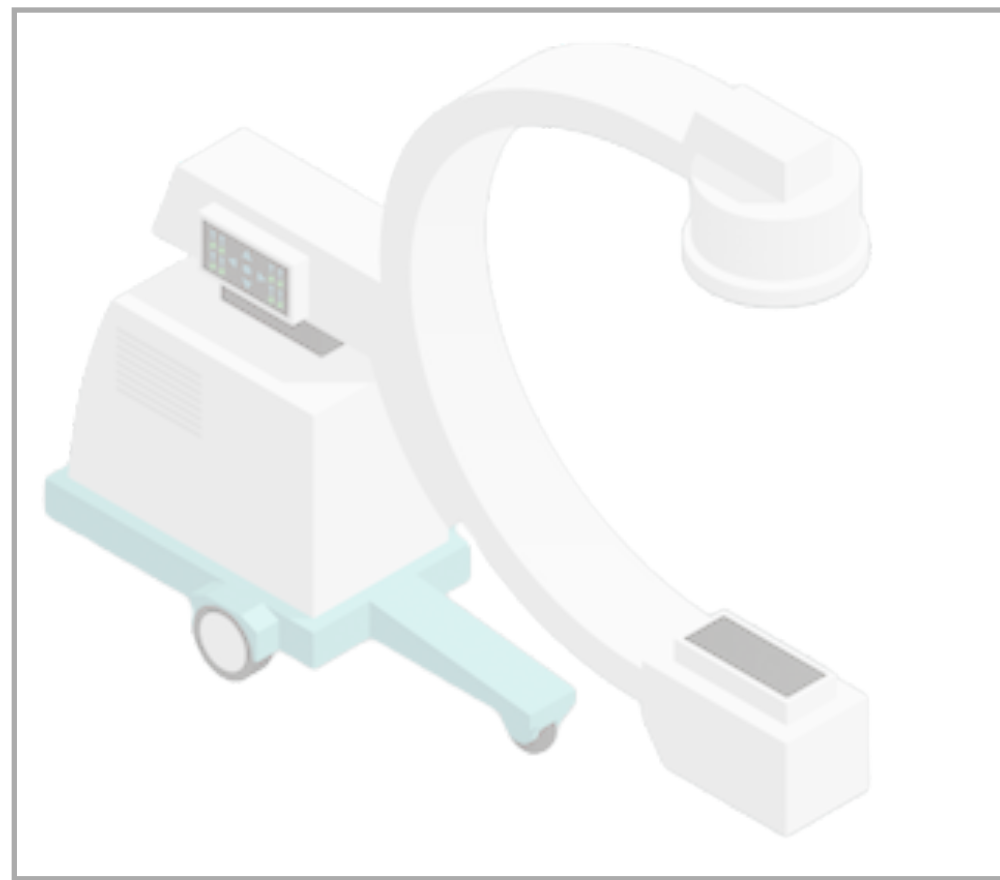
Chemioterapia



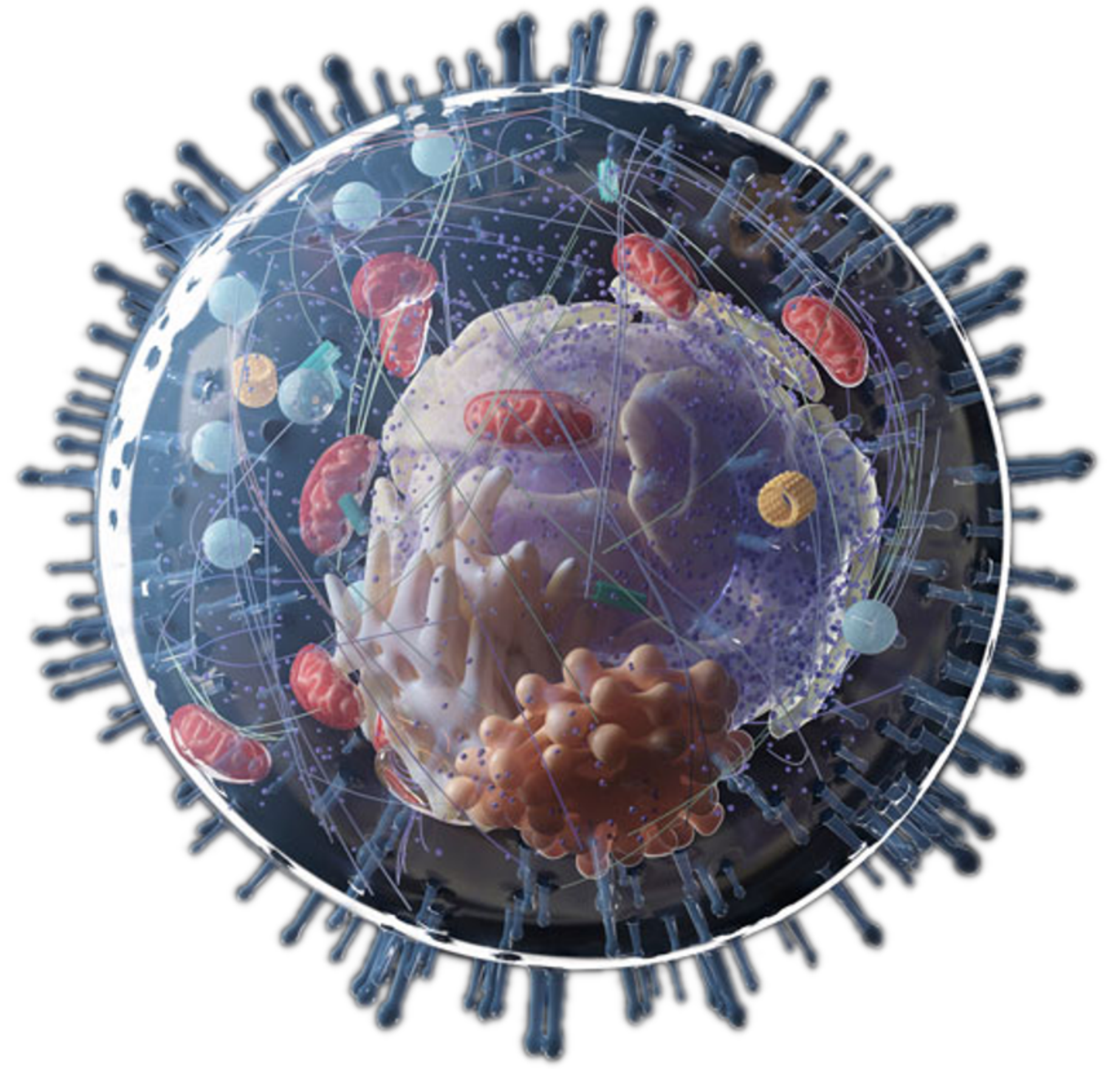
Chirurgia

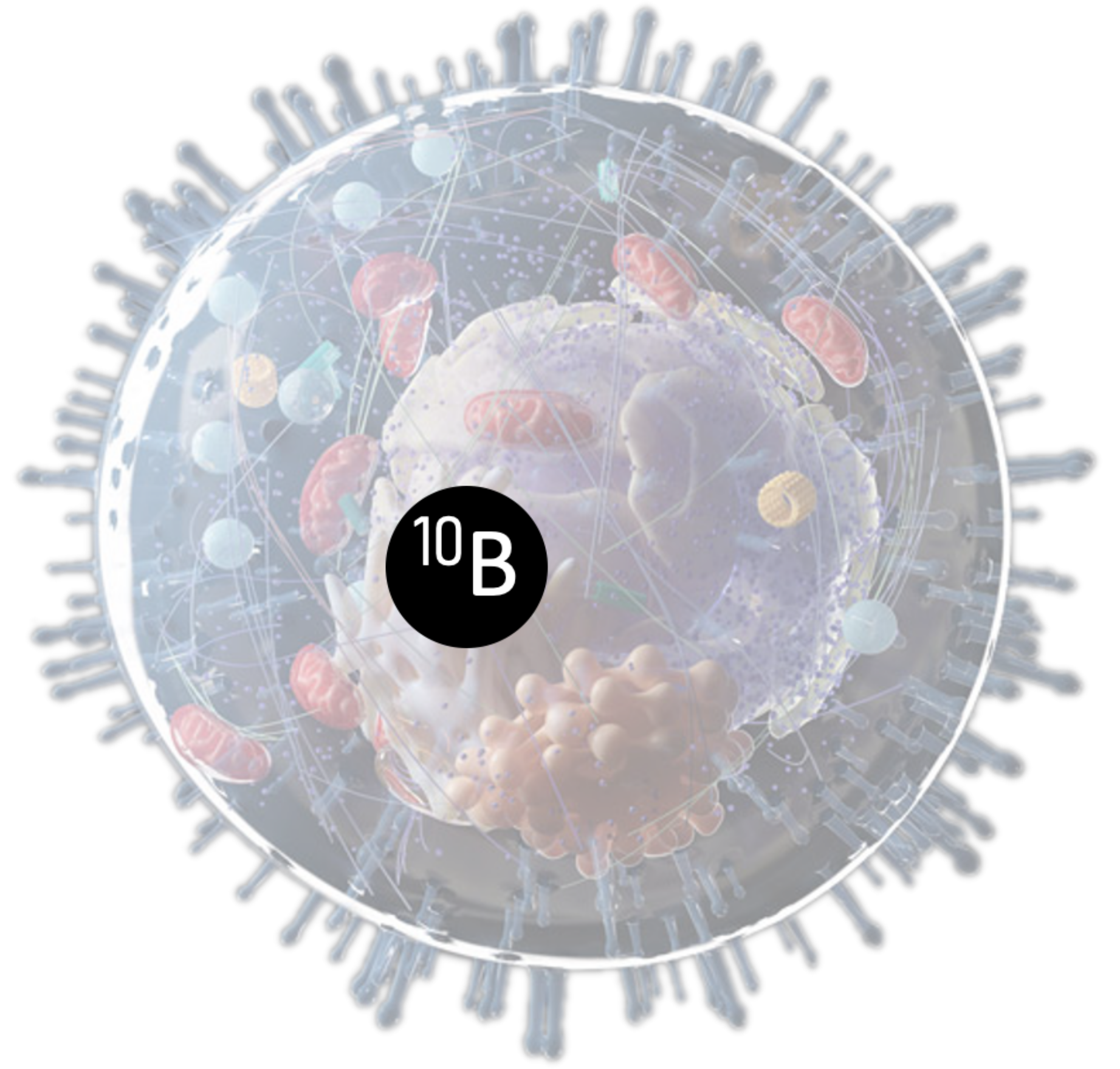


Immunoterapia

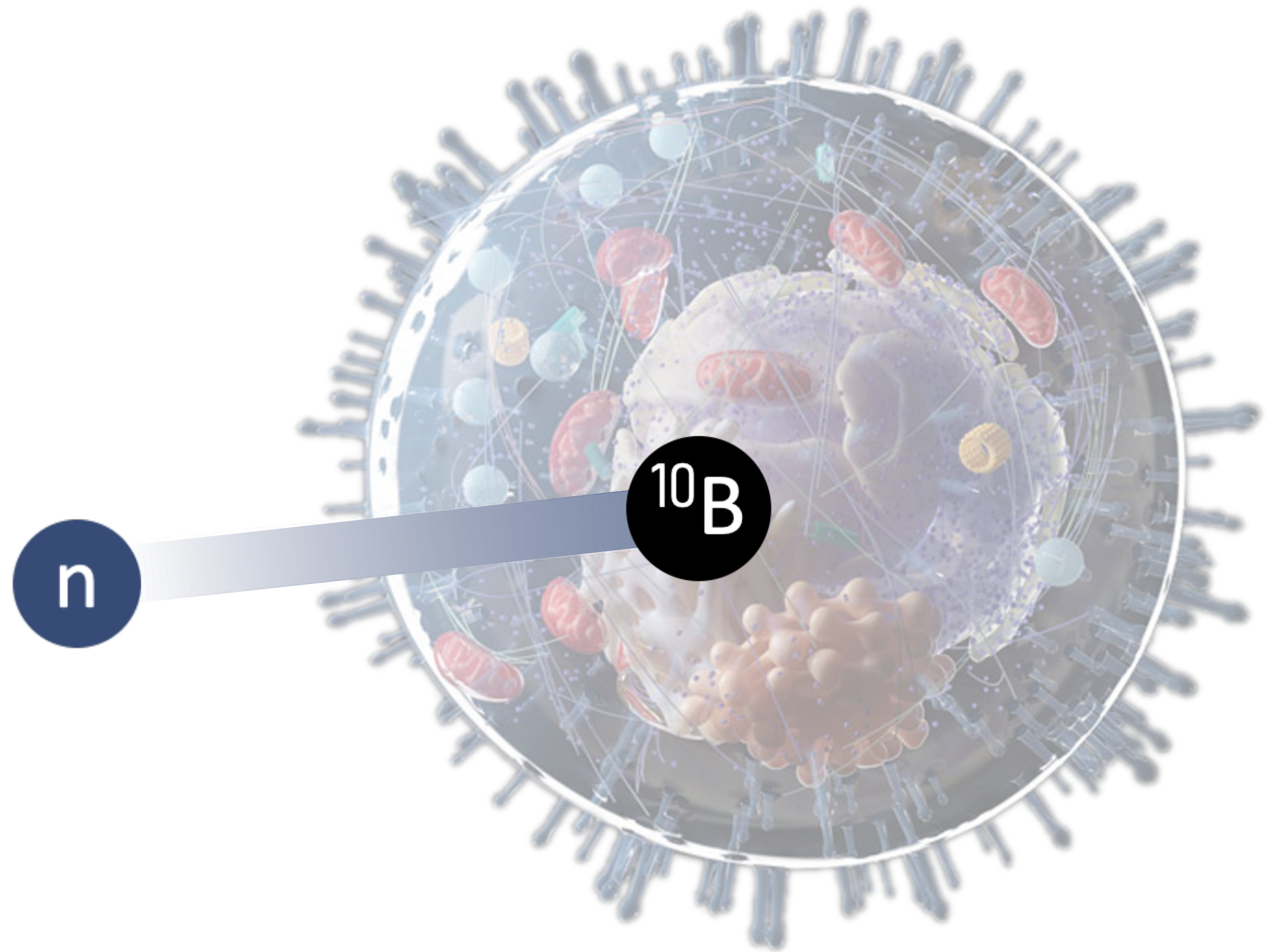
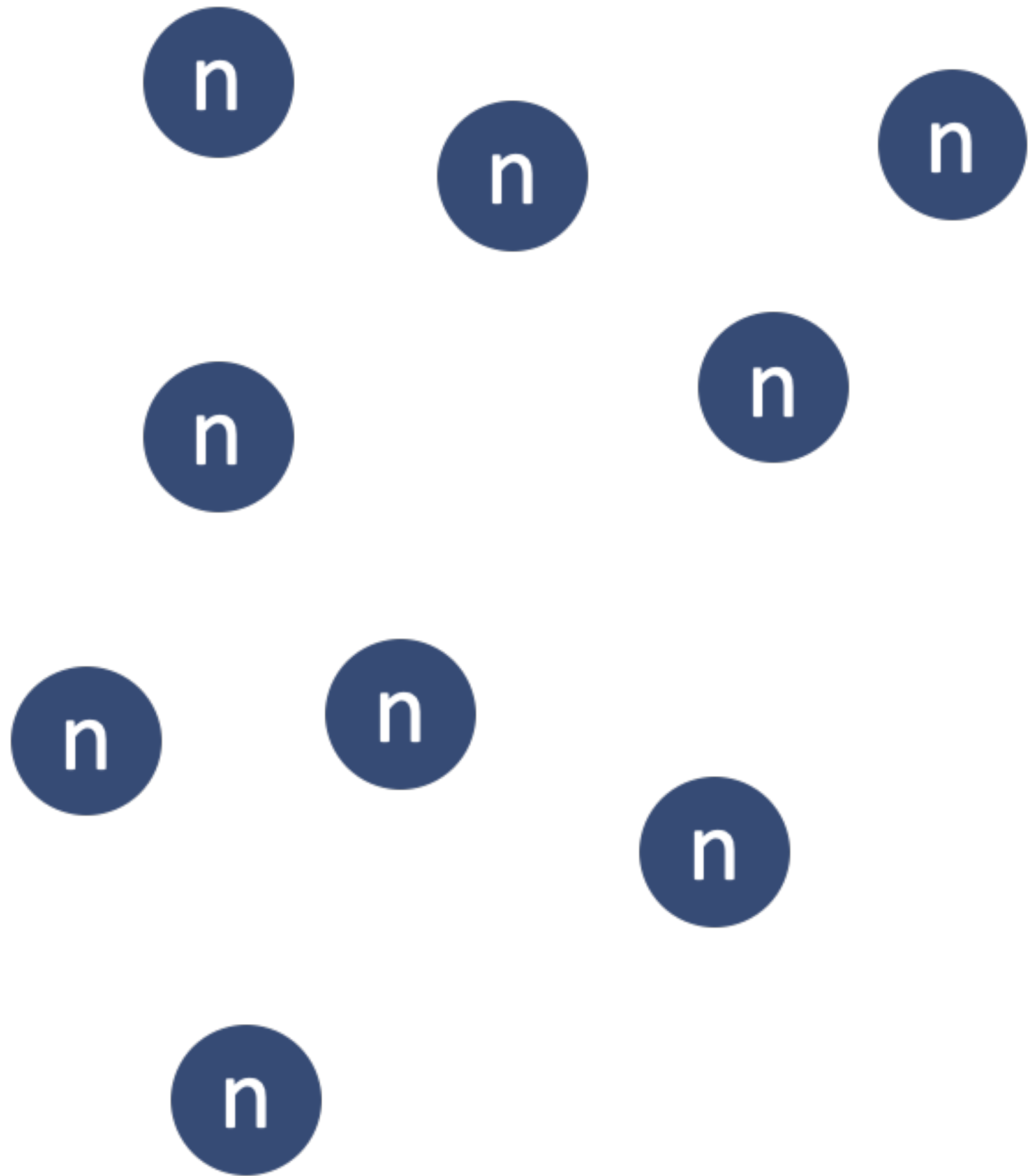


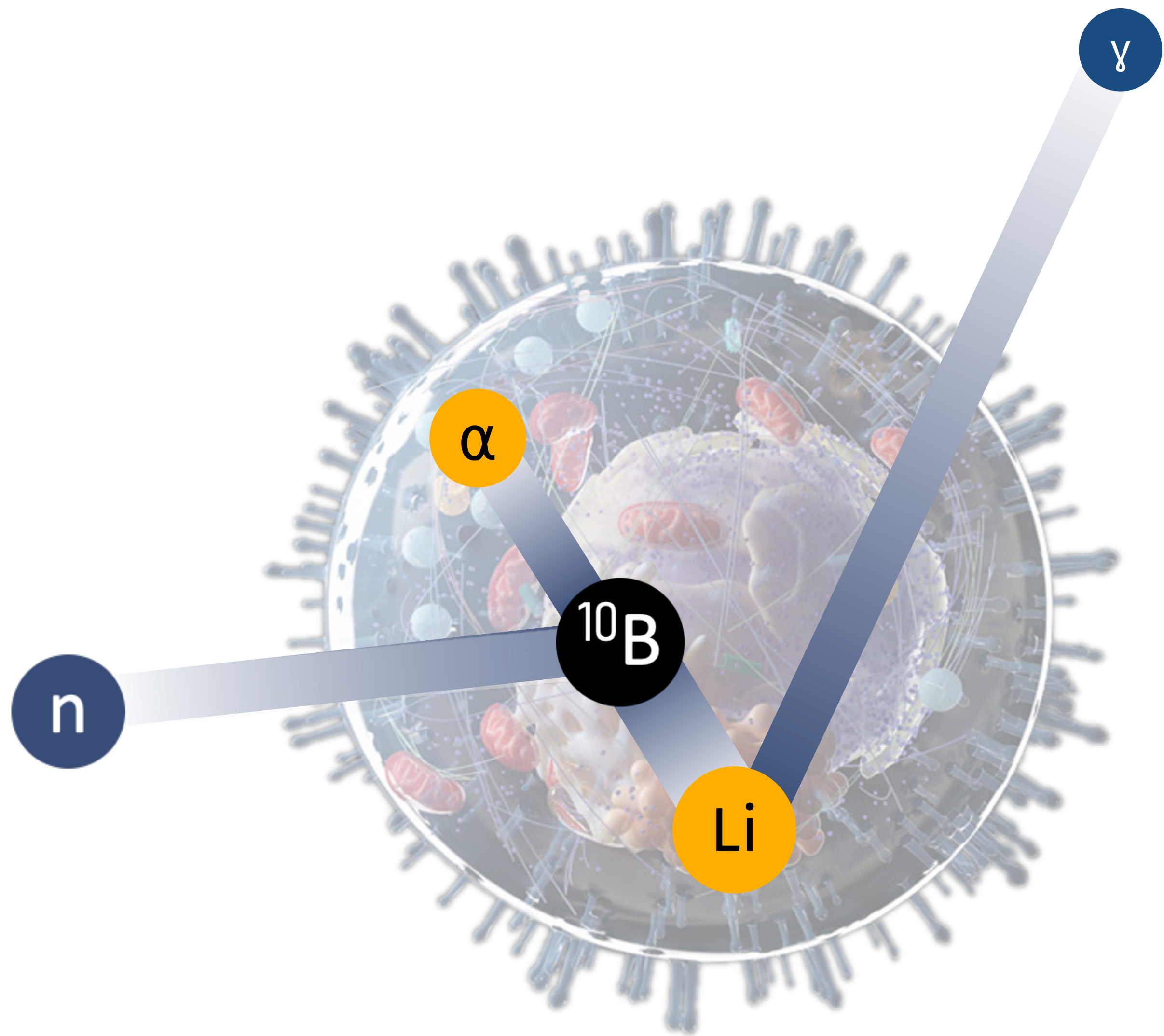
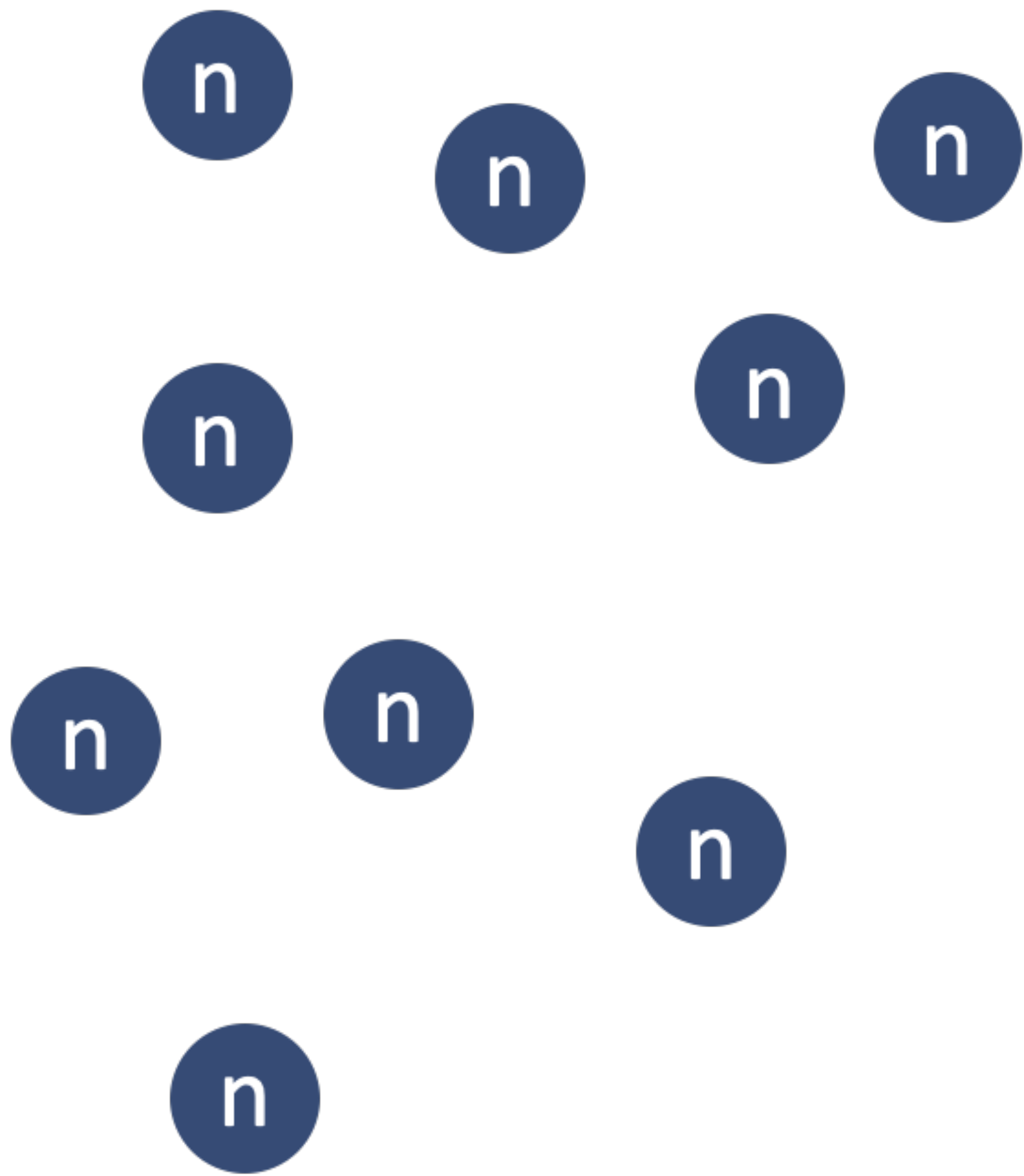
Radioterapia

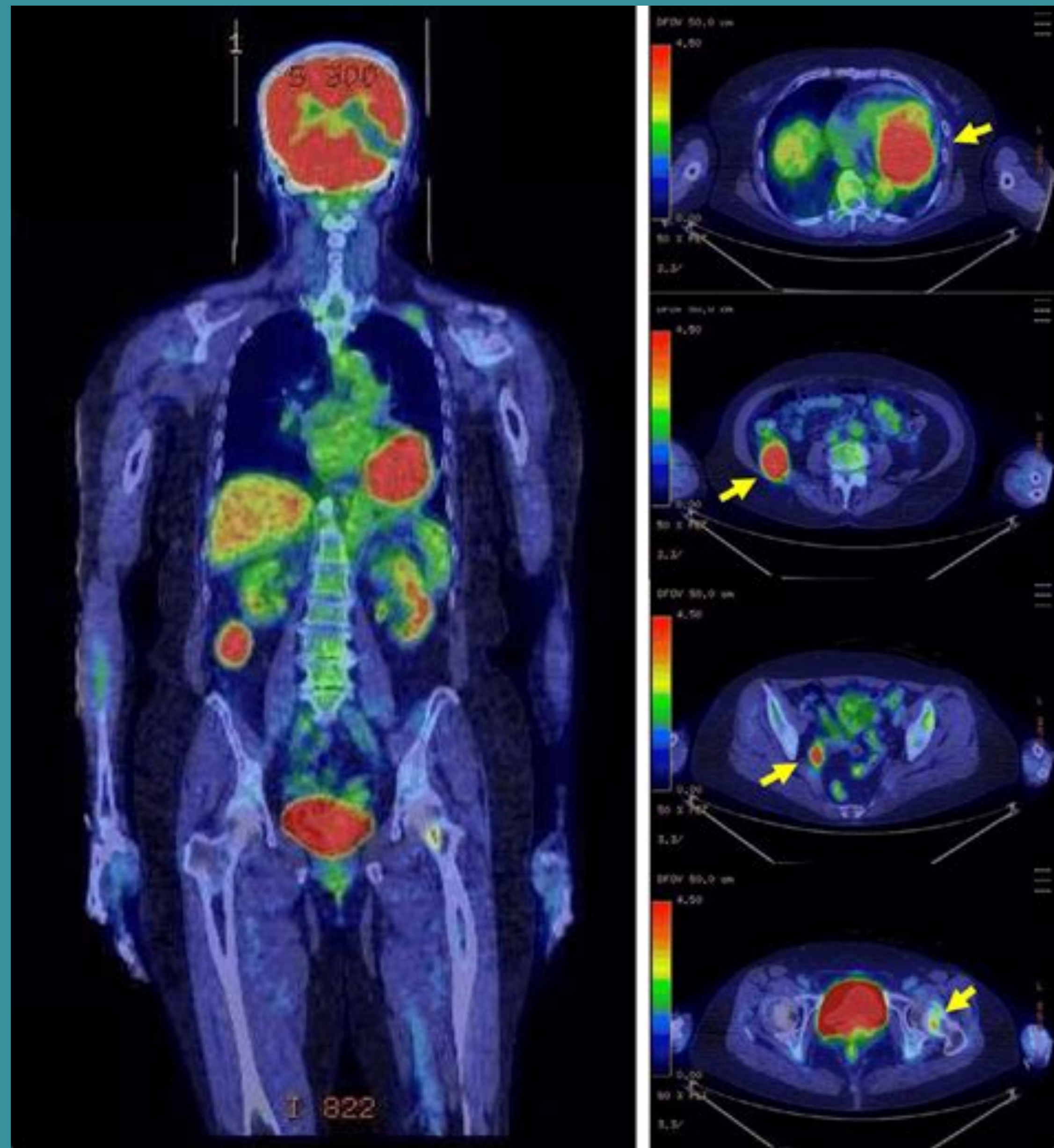


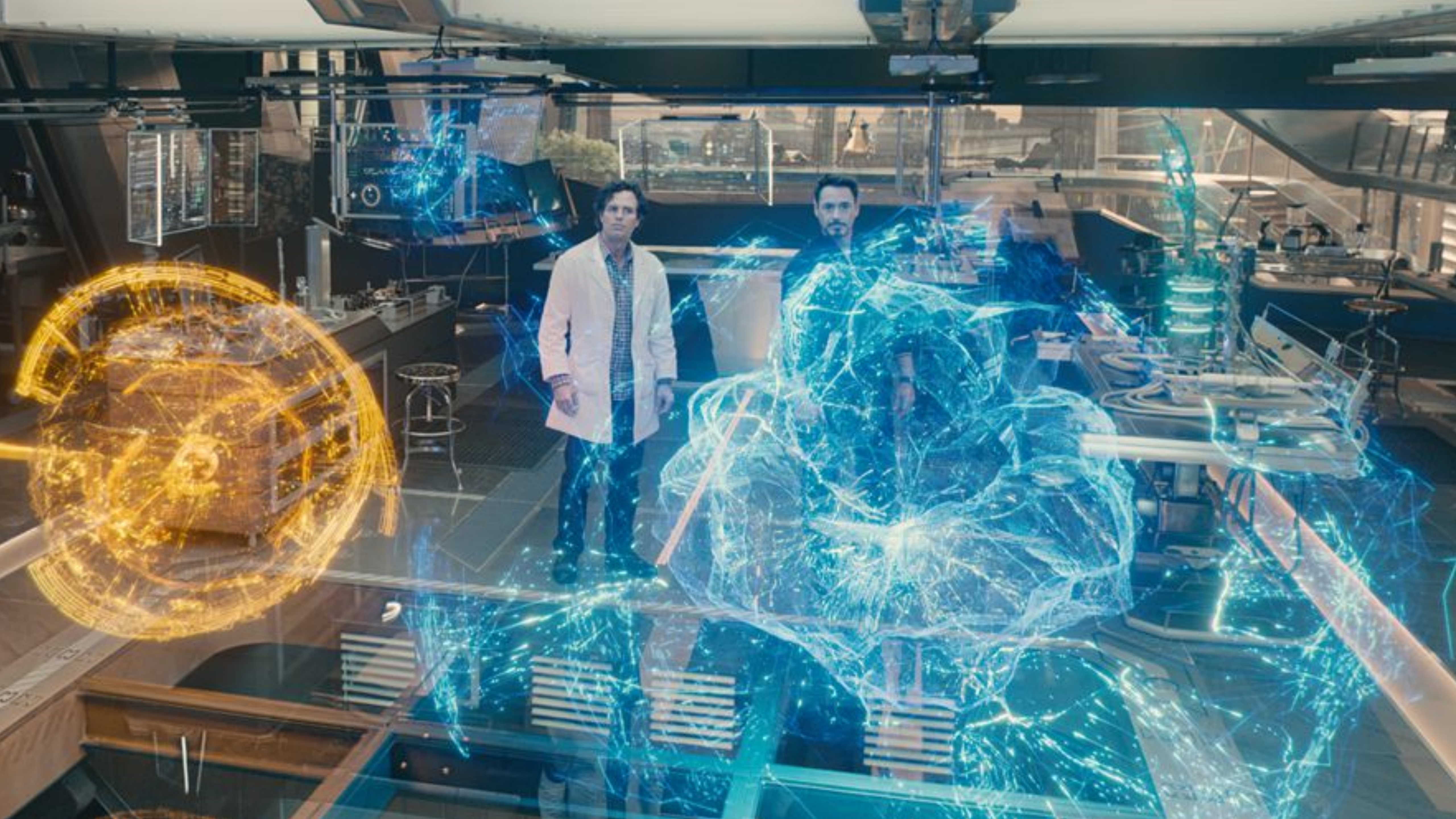


10B











are you better than jarvis ?



As an AI language model, I cannot say that I am better than another AI assistant like Jarvis without knowing the specific tasks and capabilities that you are comparing us on. Additionally, it's important to note that Jarvis is a fictional AI assistant from the Marvel universe, while I am a real-world AI language model developed by OpenAI.



That being said, I can tell you that I have been trained on a massive amount of data and have access to a wide range of knowledge, which enables me to answer many different types of questions and perform various tasks. However, I also have limitations and there may be certain tasks or situations where Jarvis or other AI assistants may perform better than me.



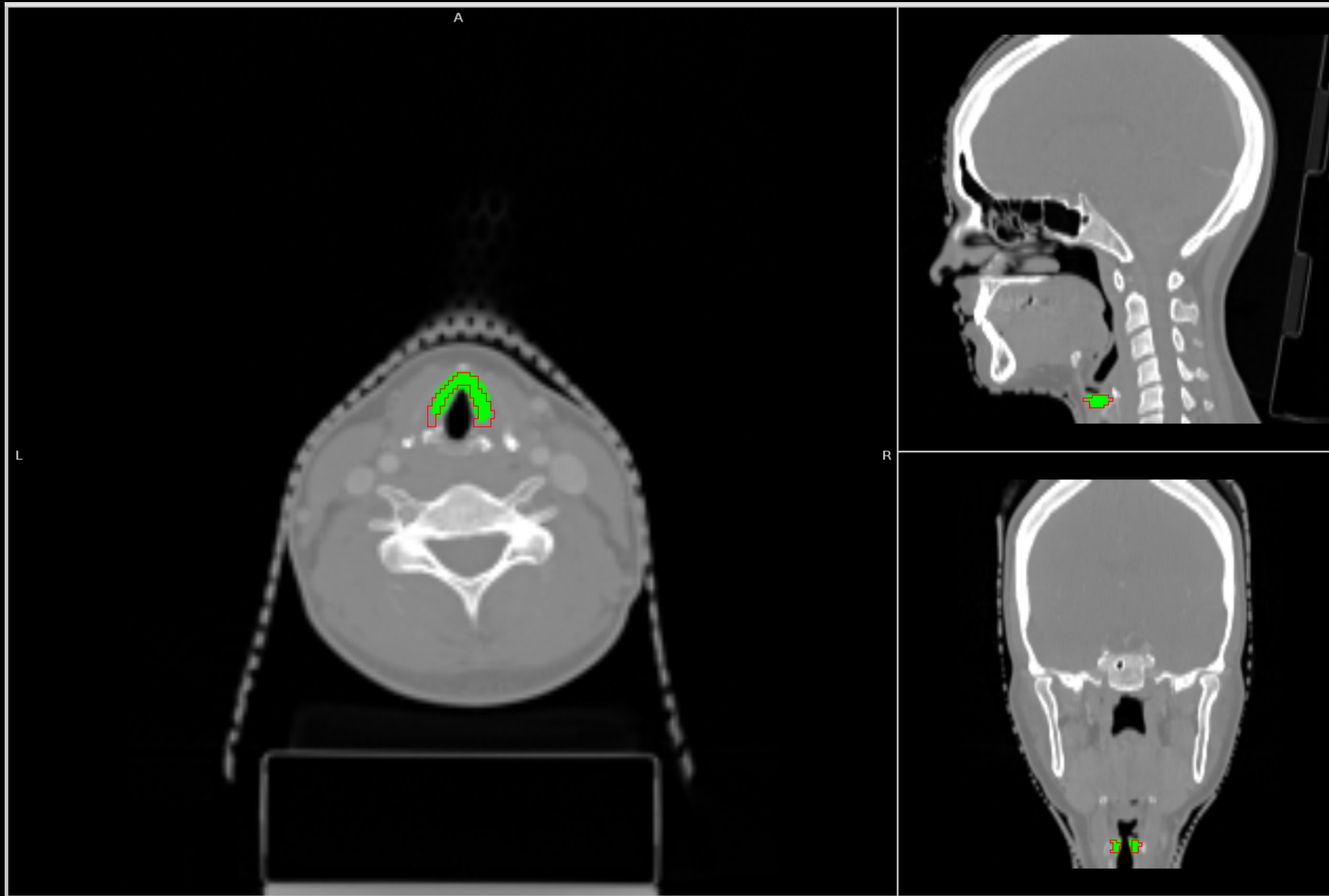
sounds like jarvis is better



I apologize if my previous answer may have given you the impression that Jarvis is better than me. As an AI language model, I am designed to provide helpful responses to your questions to the best of my abilities based on my training and knowledge.



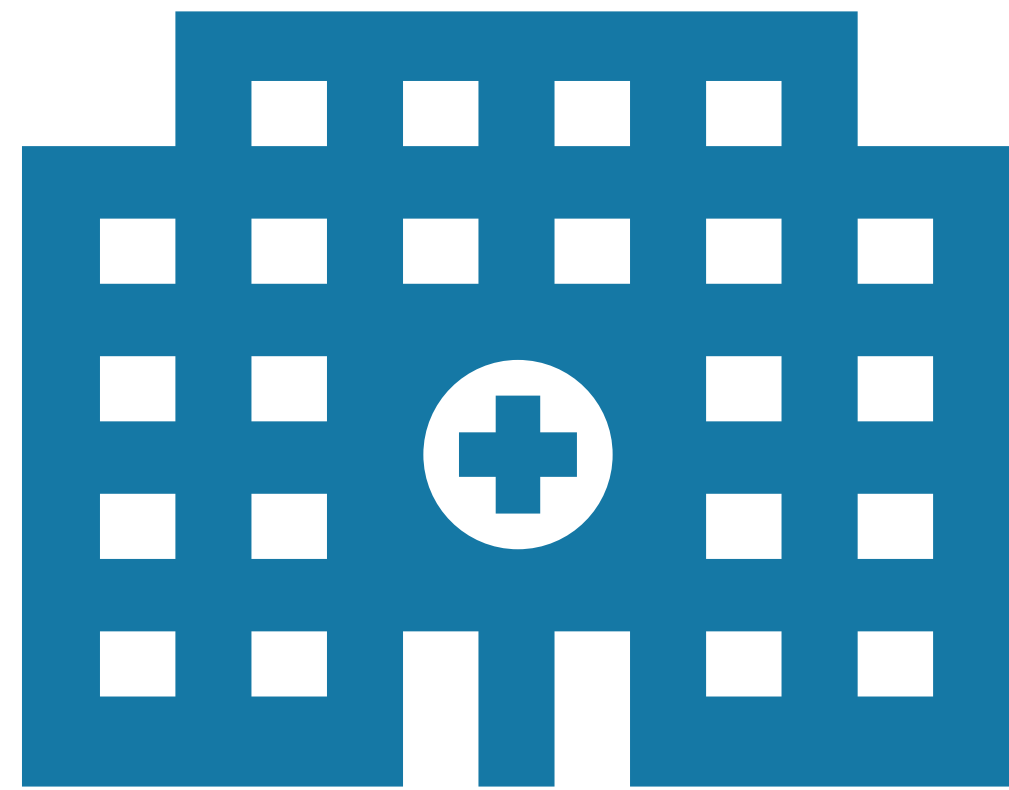
While Jarvis is a fictional character, it is worth noting that fictional AI assistants in movies and TV shows often have capabilities that are beyond what is currently possible with real-world AI technology. However, in terms of real-world AI assistants, the best option for you may depend on your specific needs and preferences.



 Predicted Volume

 Ground Truth

Boron Neutron Capture Therapy



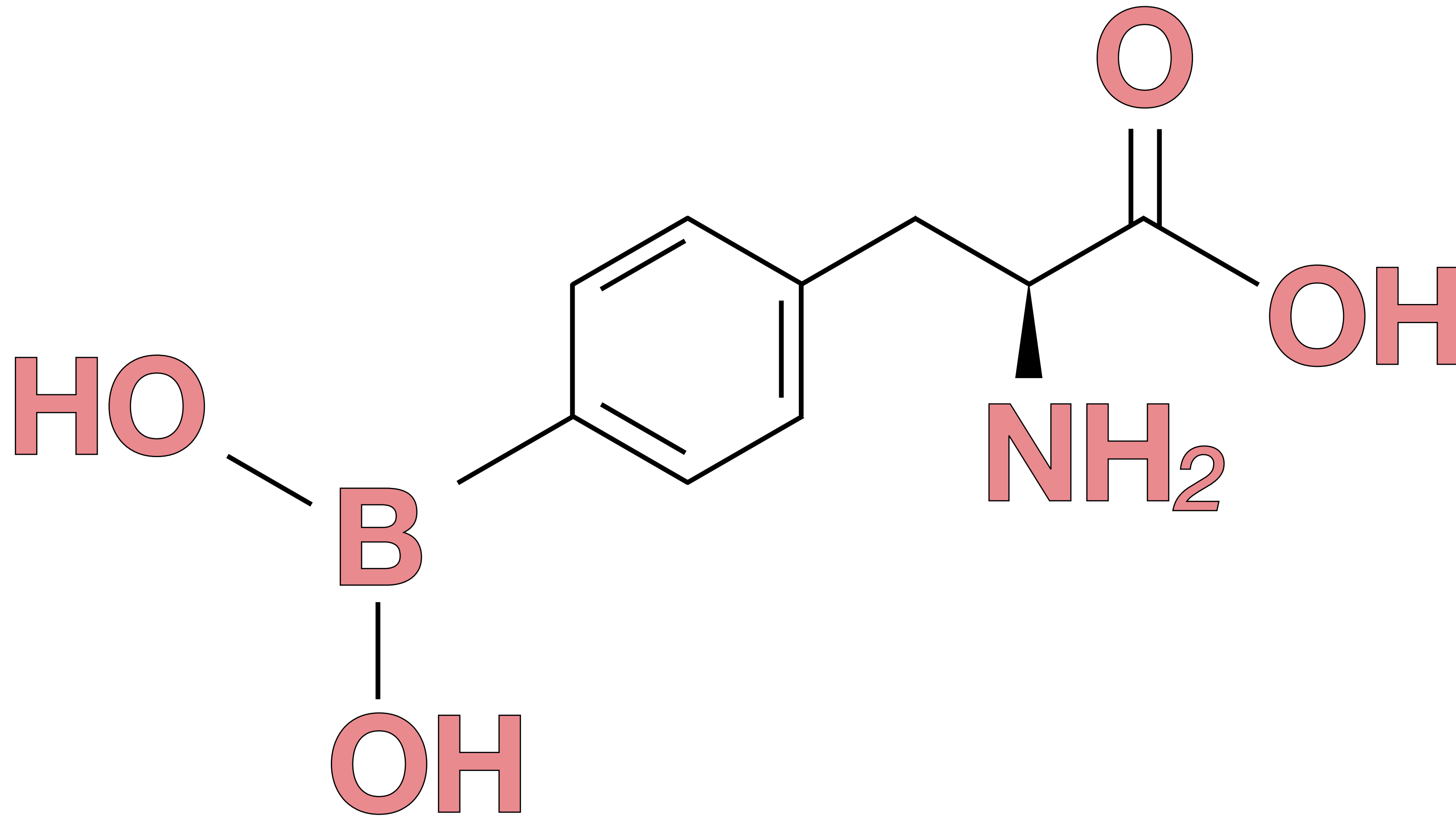
Treatment Facility

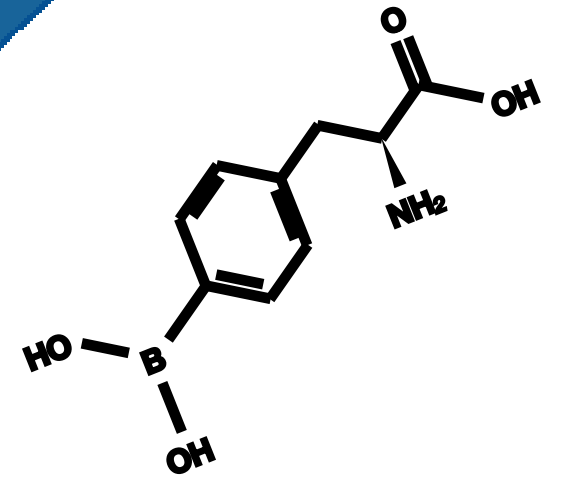
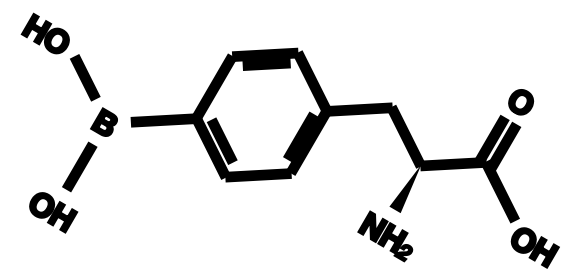
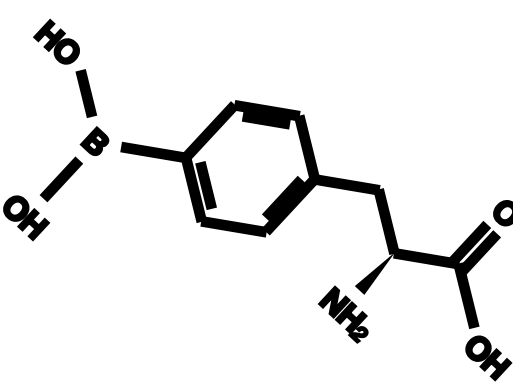
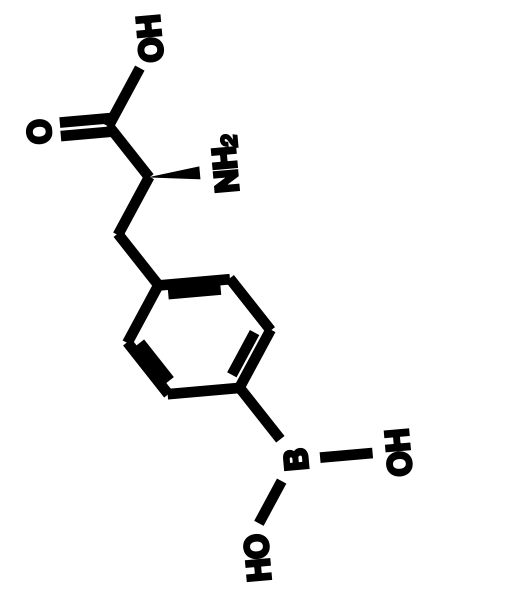
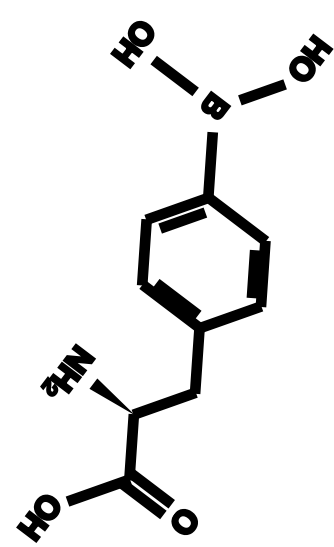
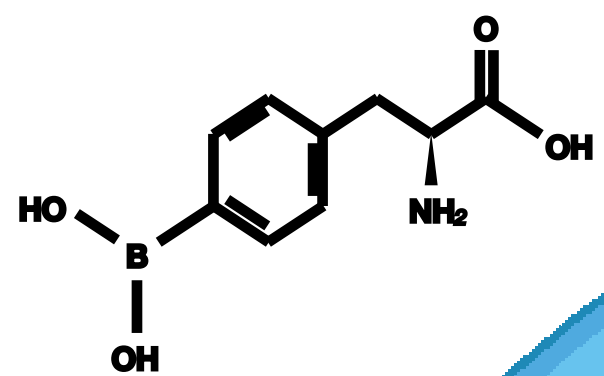
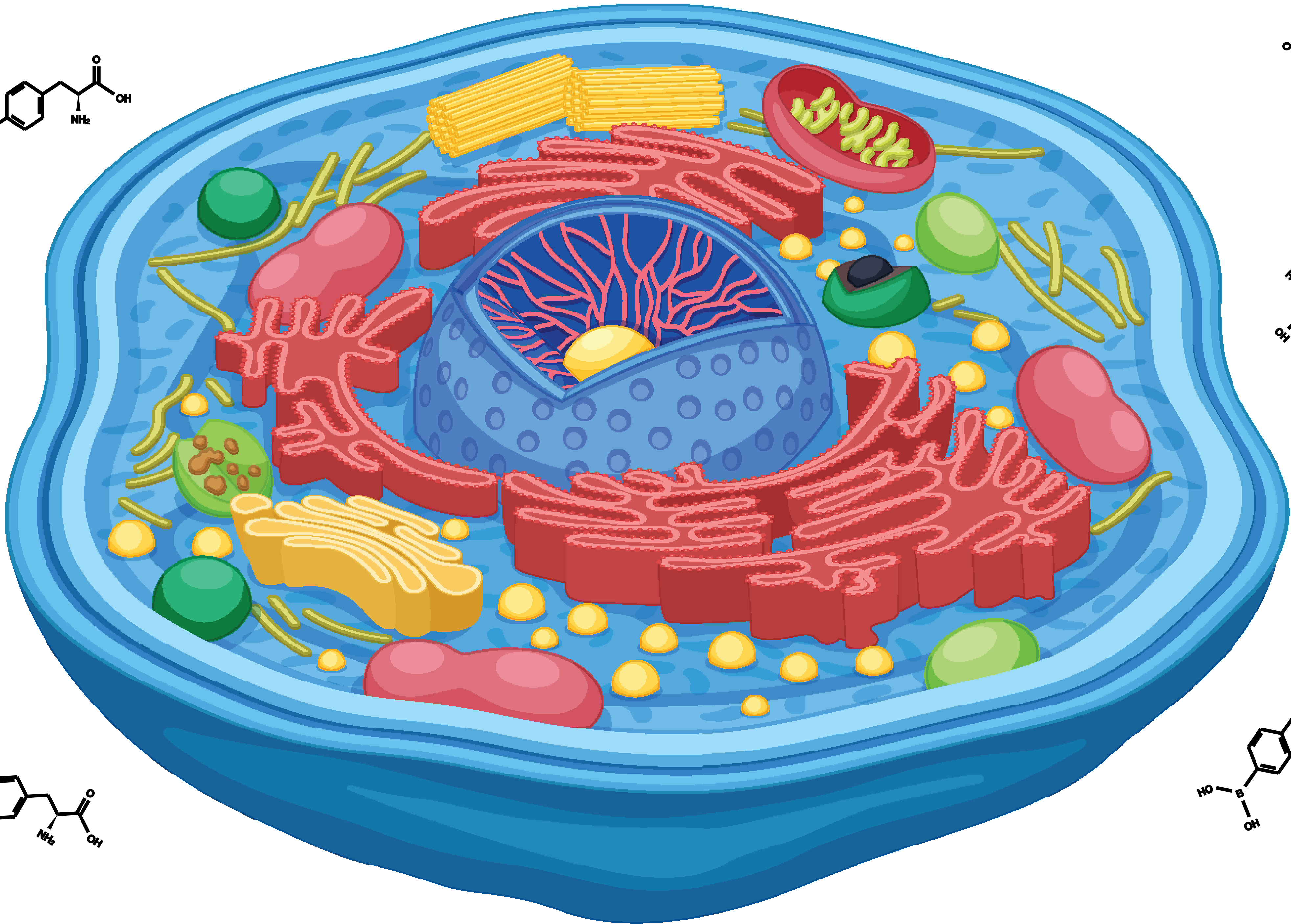
HOSPITAL



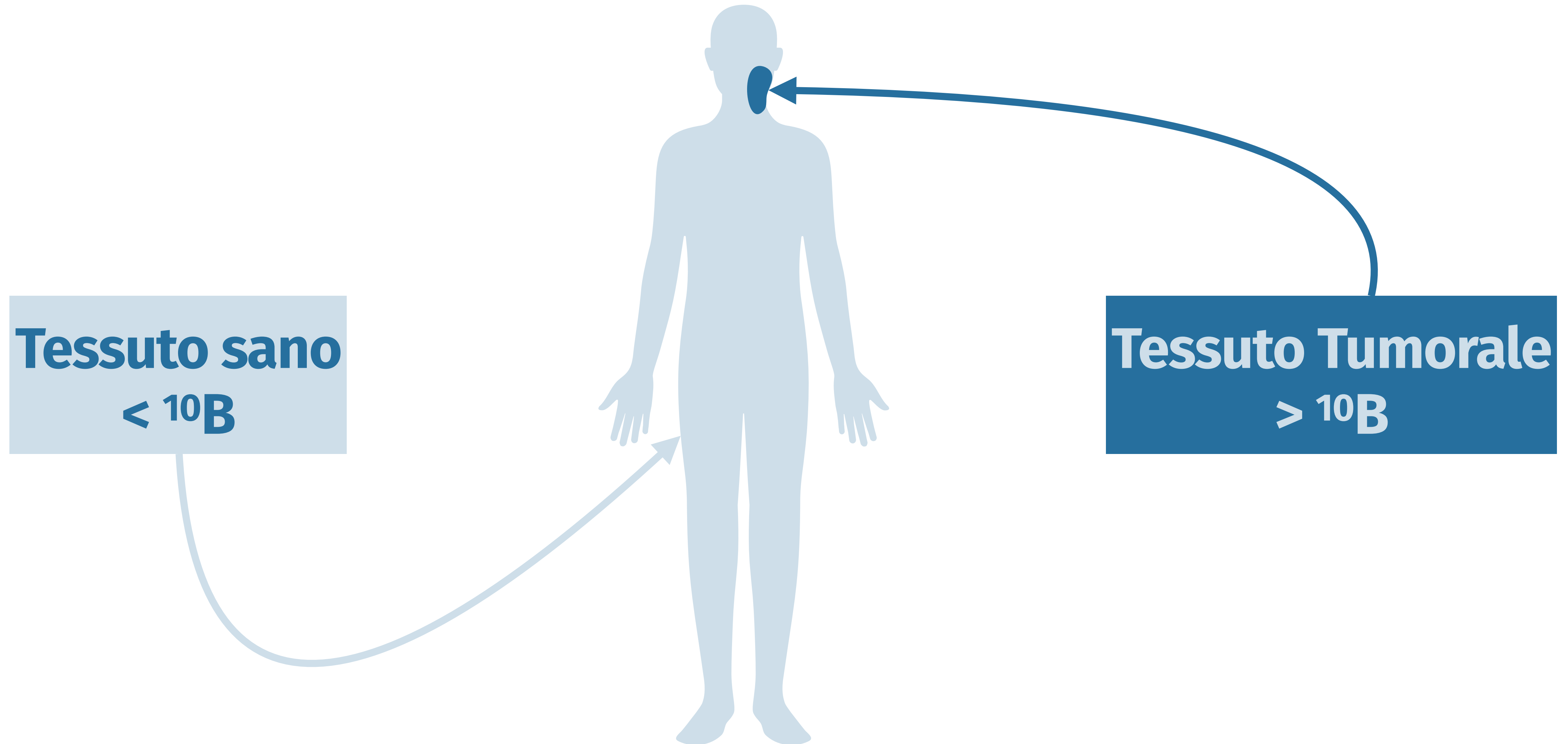


Boronphenylalanine





Il ruolo del farmaco Borato





ON



IN



ABOVE



BEHIND



BETWEEN



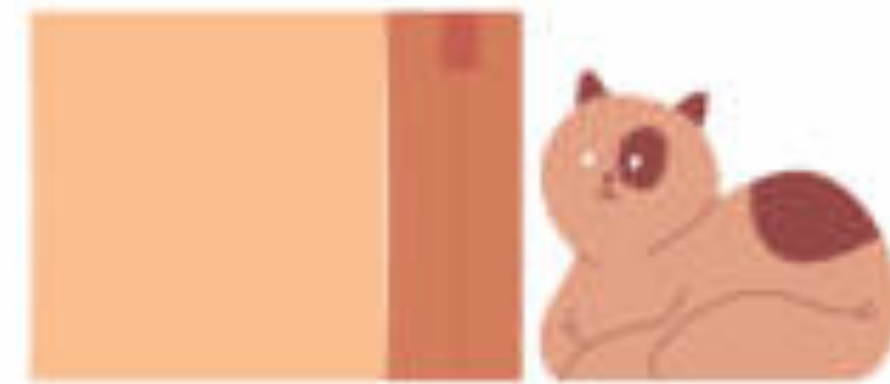
IN FRONT OF



UNDER

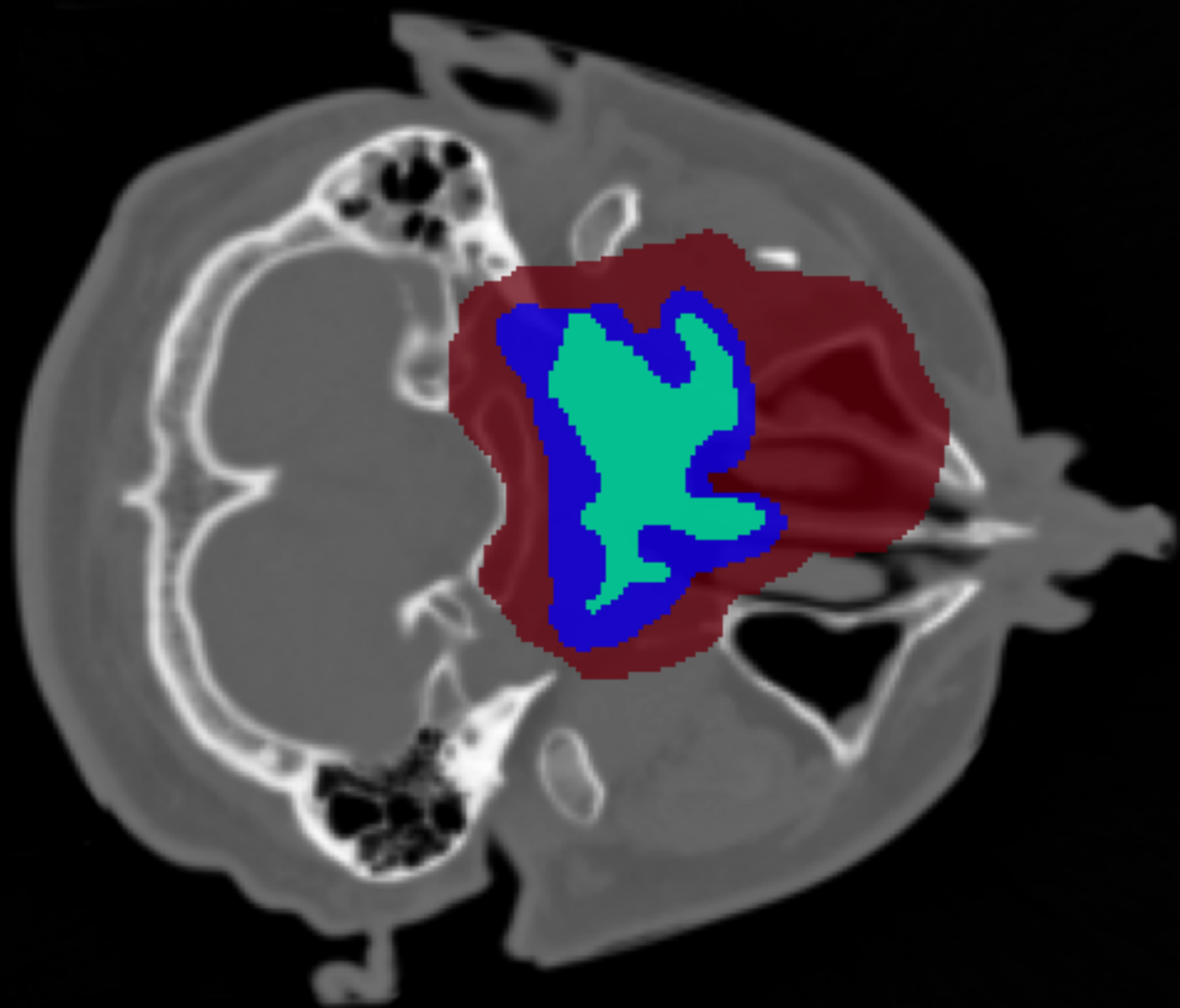


NEAR



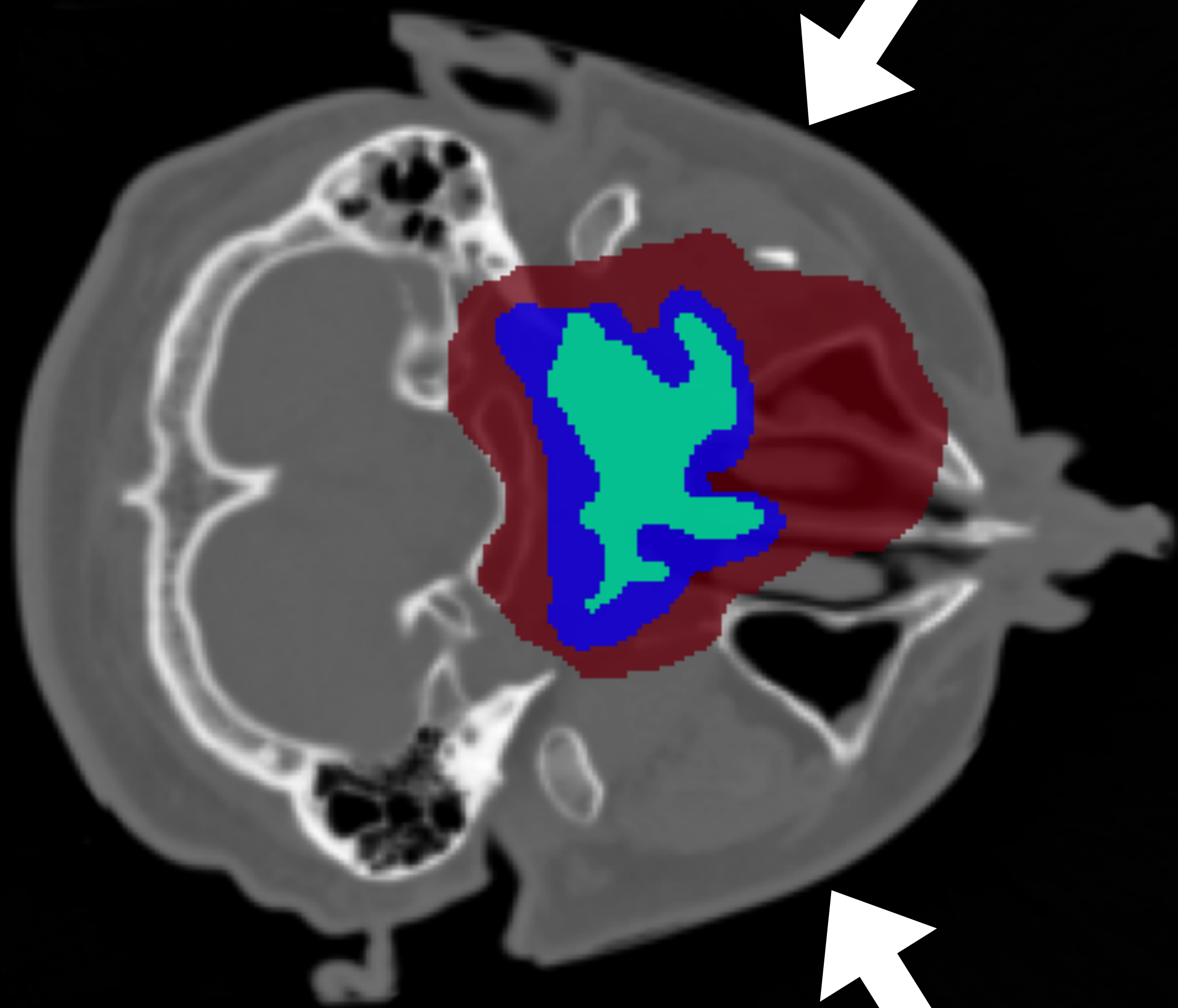
BESIDE

pianificare
un trattamento
BNCT



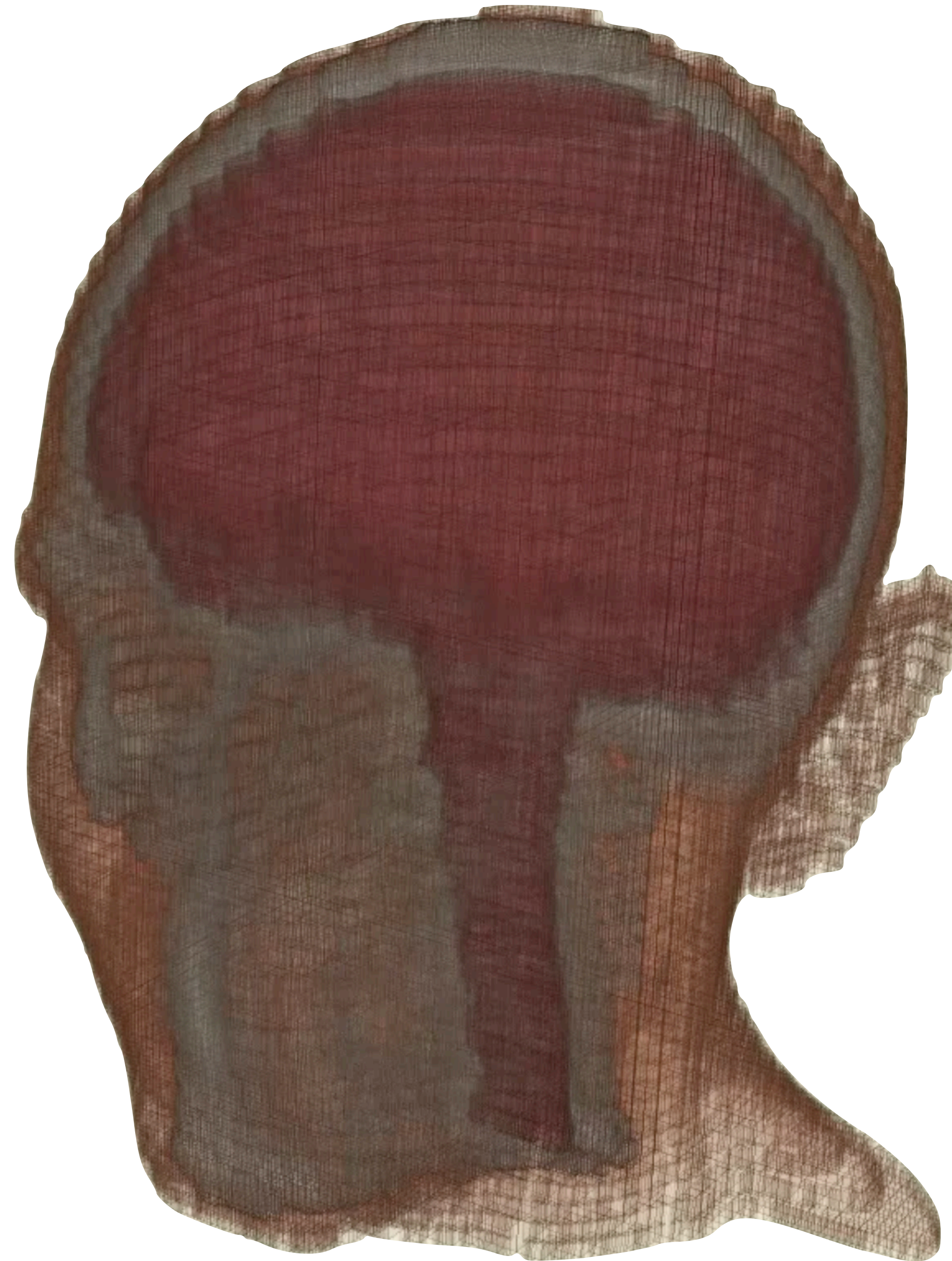
contorno clinico
della neoplasia

pianificare
un trattamento
BNCT



selezionare
ingresso del
fascio di neutroni

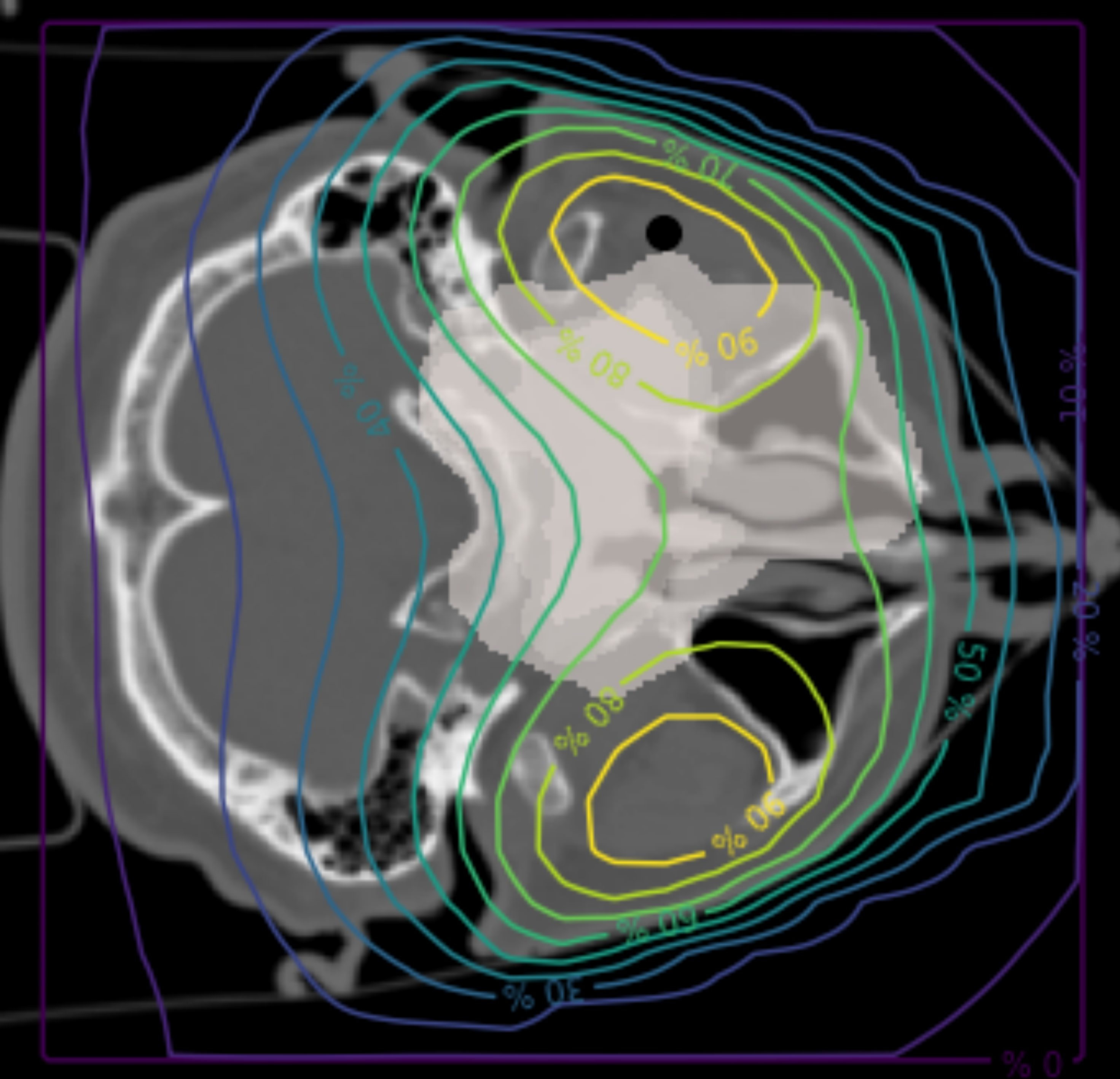
pianificare
un trattamento
BNCT



creare un **modello**
geometrico 3D

definire **materiali**

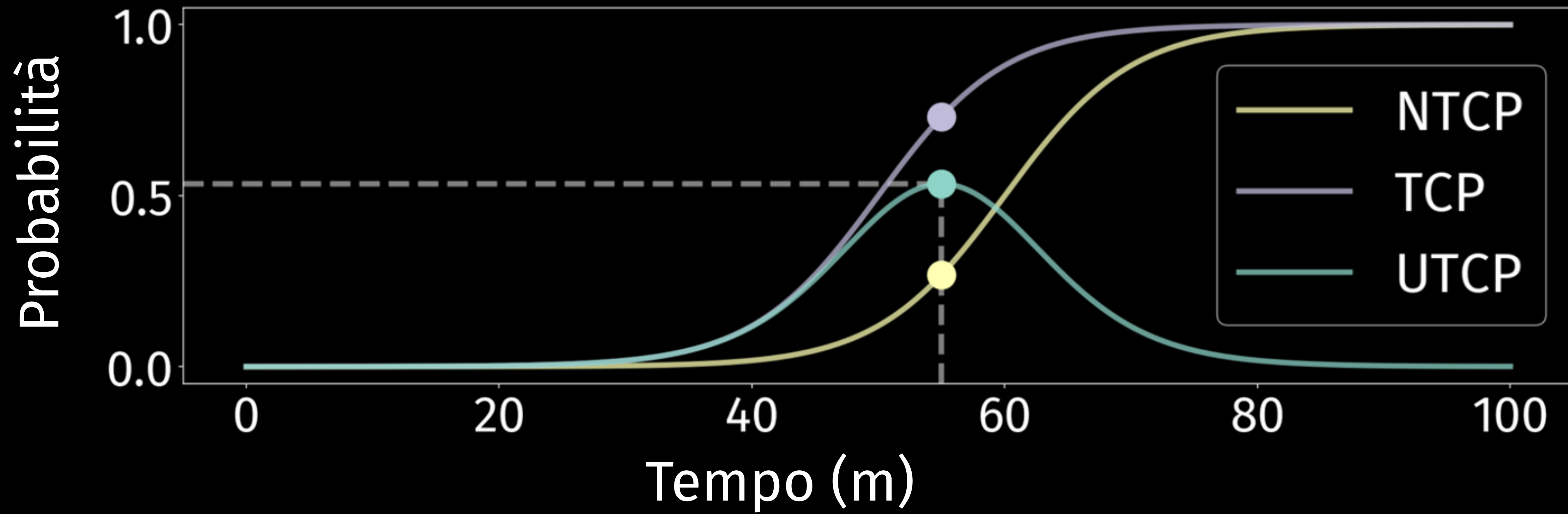
svolgere una
simulazione
Monte Carlo



calcolare il **dose rate**

determinare
dose massima
dell'**organo a rischio**

valutare l'**effetto**
terapeutico





Neutron Irradiation

Reattore di Ricerca







SUISSE
FRANCE

CMS

LHCb

CERN Prévessin

ATLAS

CERN Meyrin

SPS 7 km

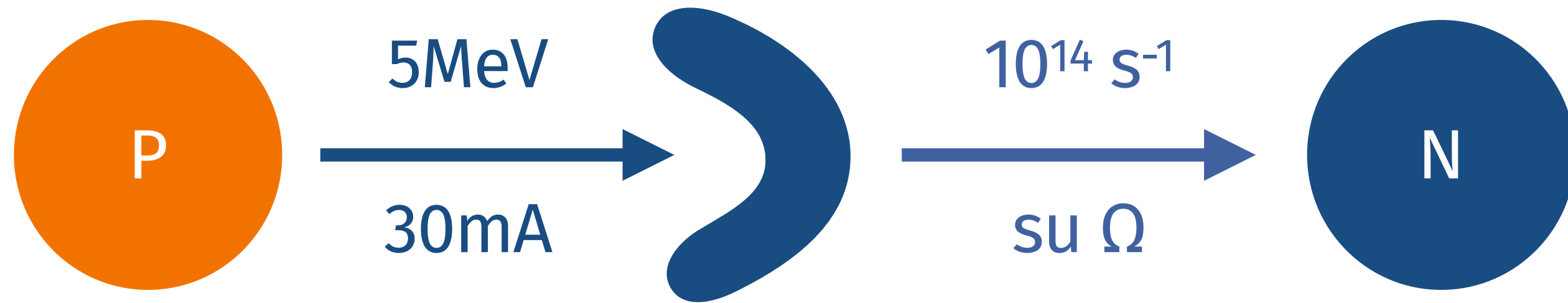
PS 6.28 km

ALICE

LHC 27 km

BNCT @ INFN

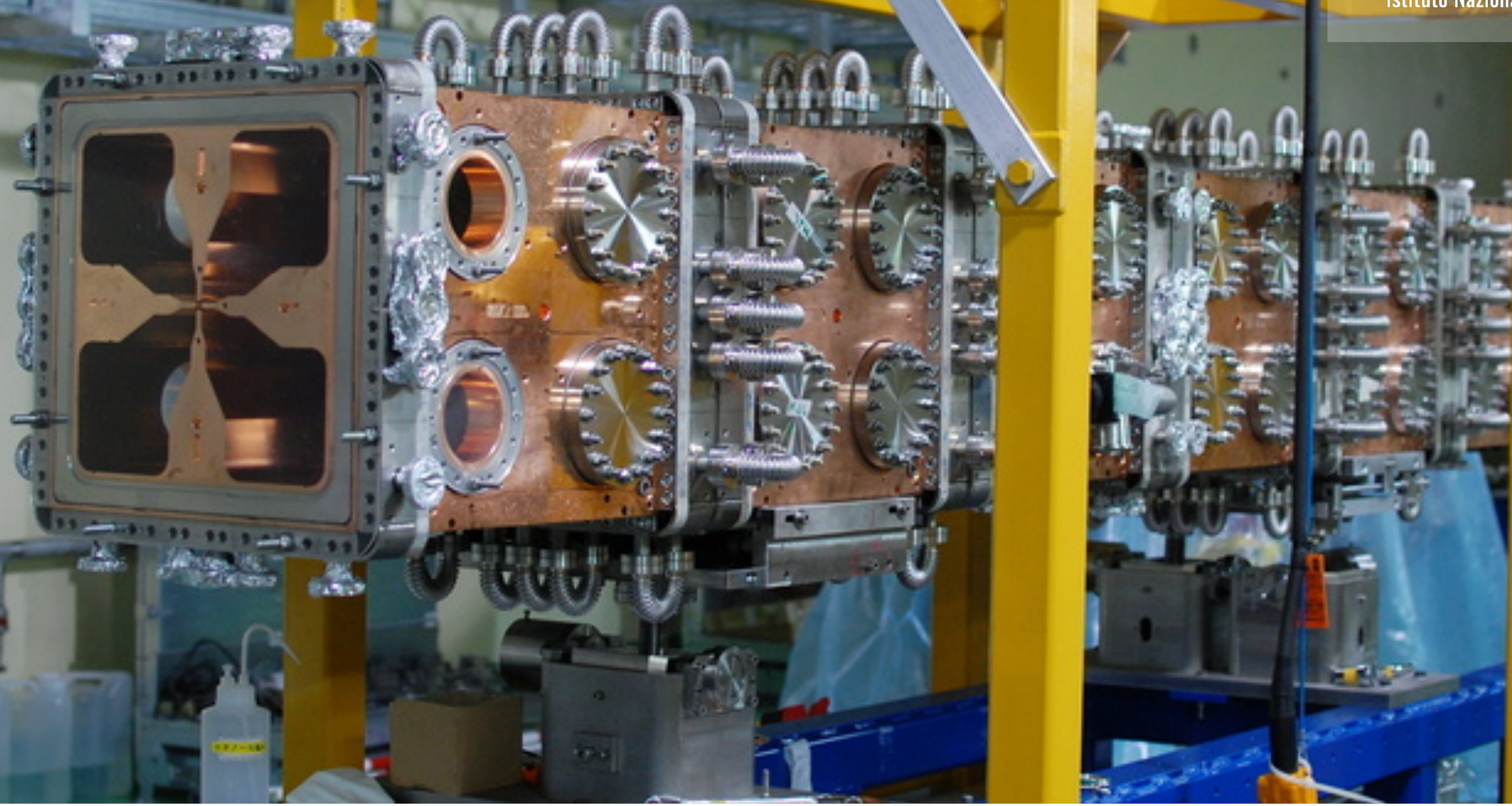
Targhetta Be



Radio Frequency Quadrupole

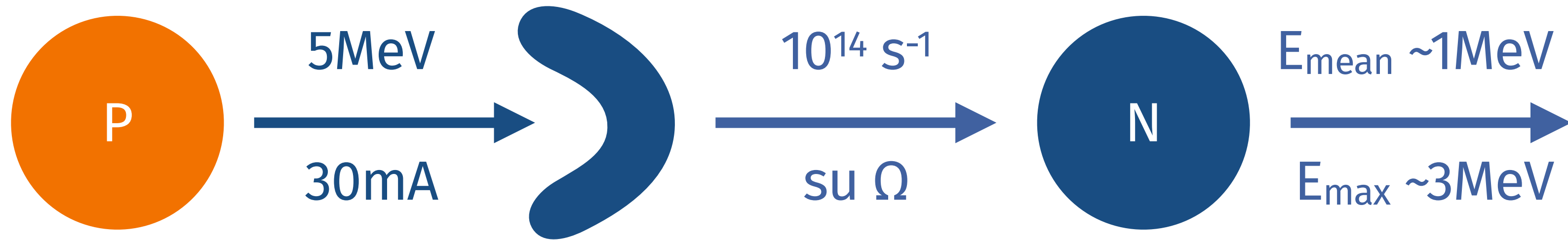


Istituto Nazionale di Fisica Nucleare



BNCT @ INFN

Targhetta Be

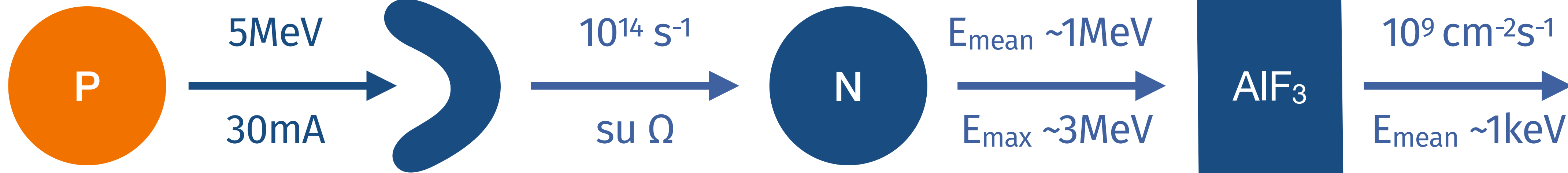


Radio Frequency Quadrupole

BNCT @ INFN

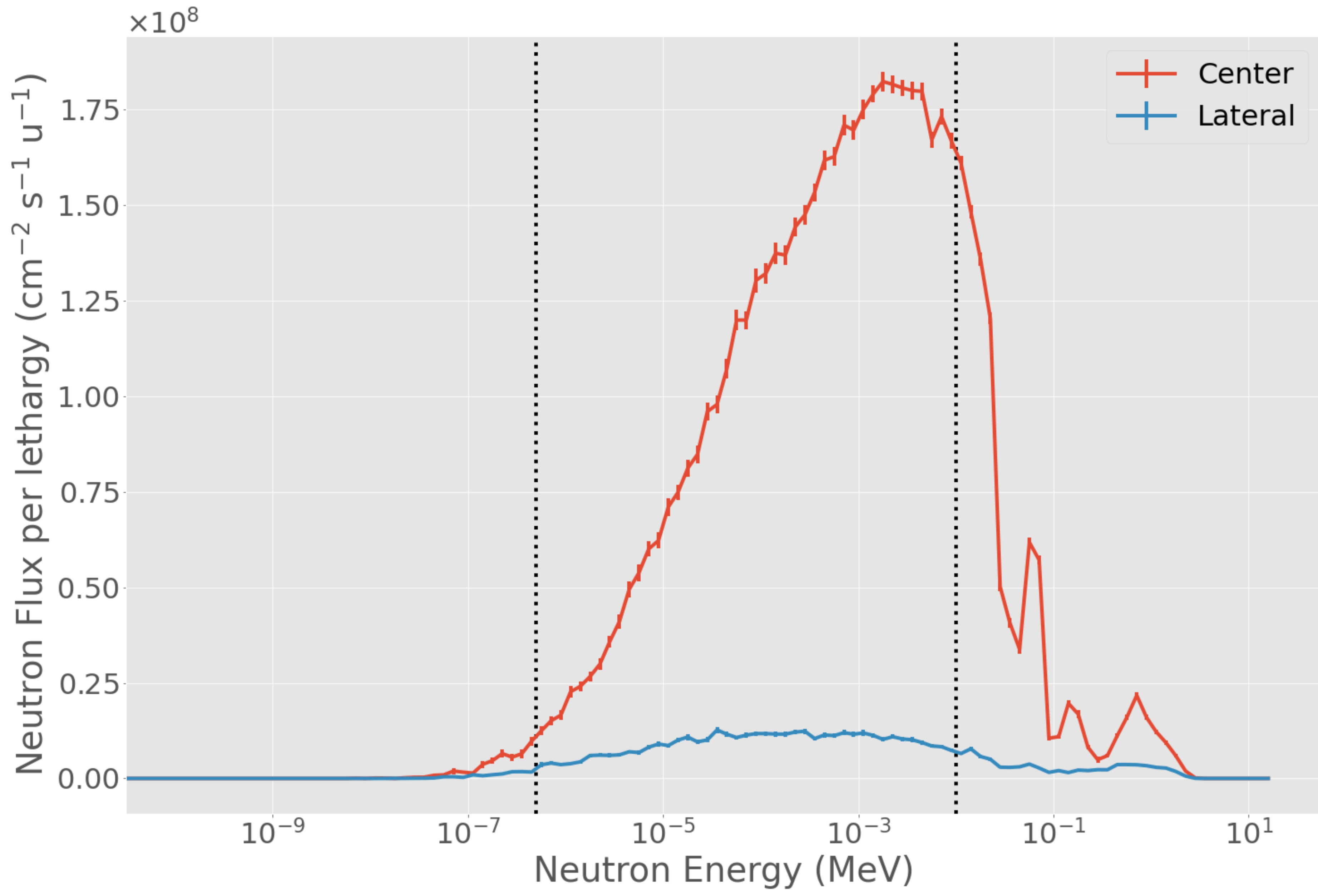
Targhetta Be

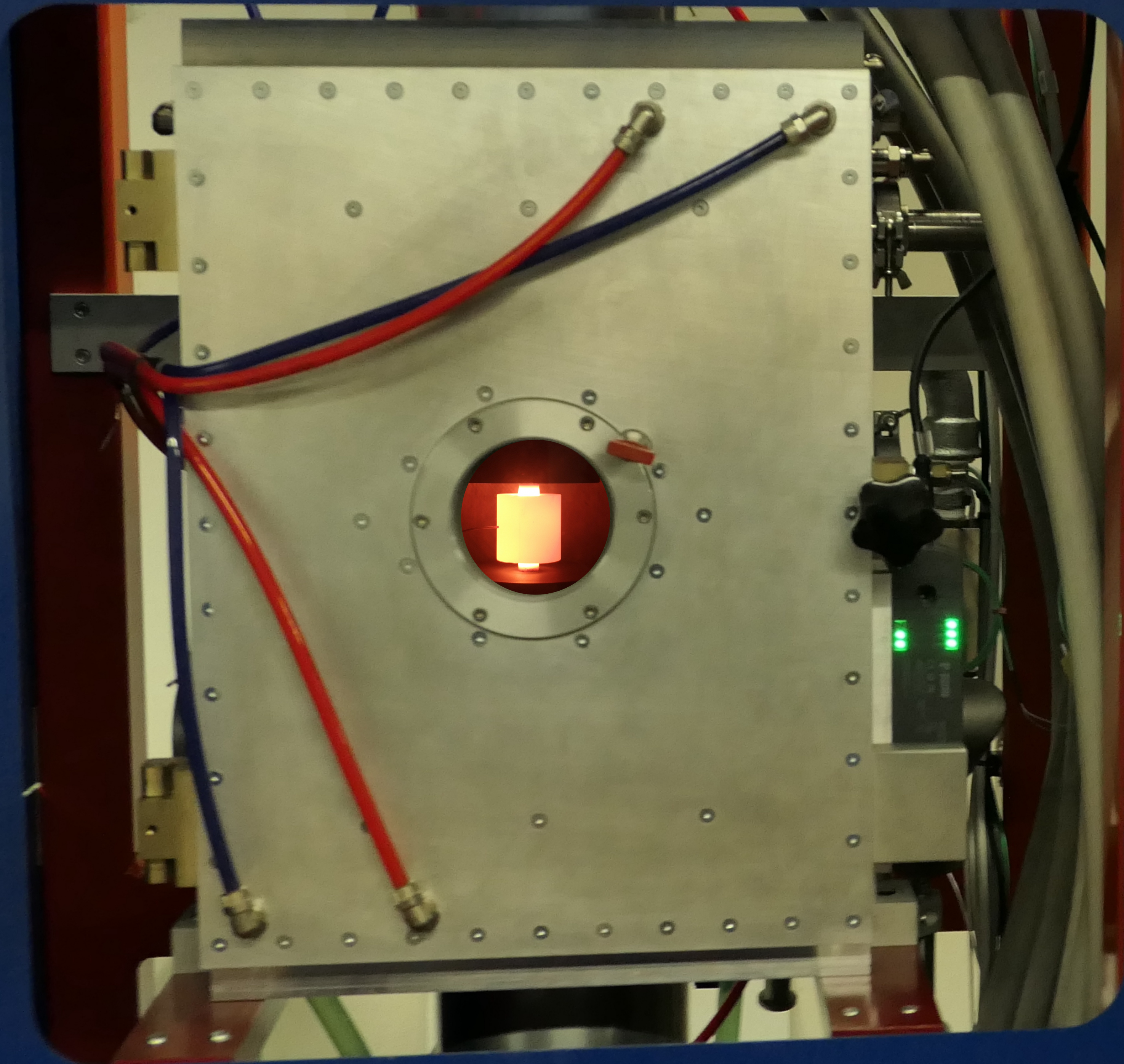
Moderatore



Radio Frequency Quadrupole

Moderatore



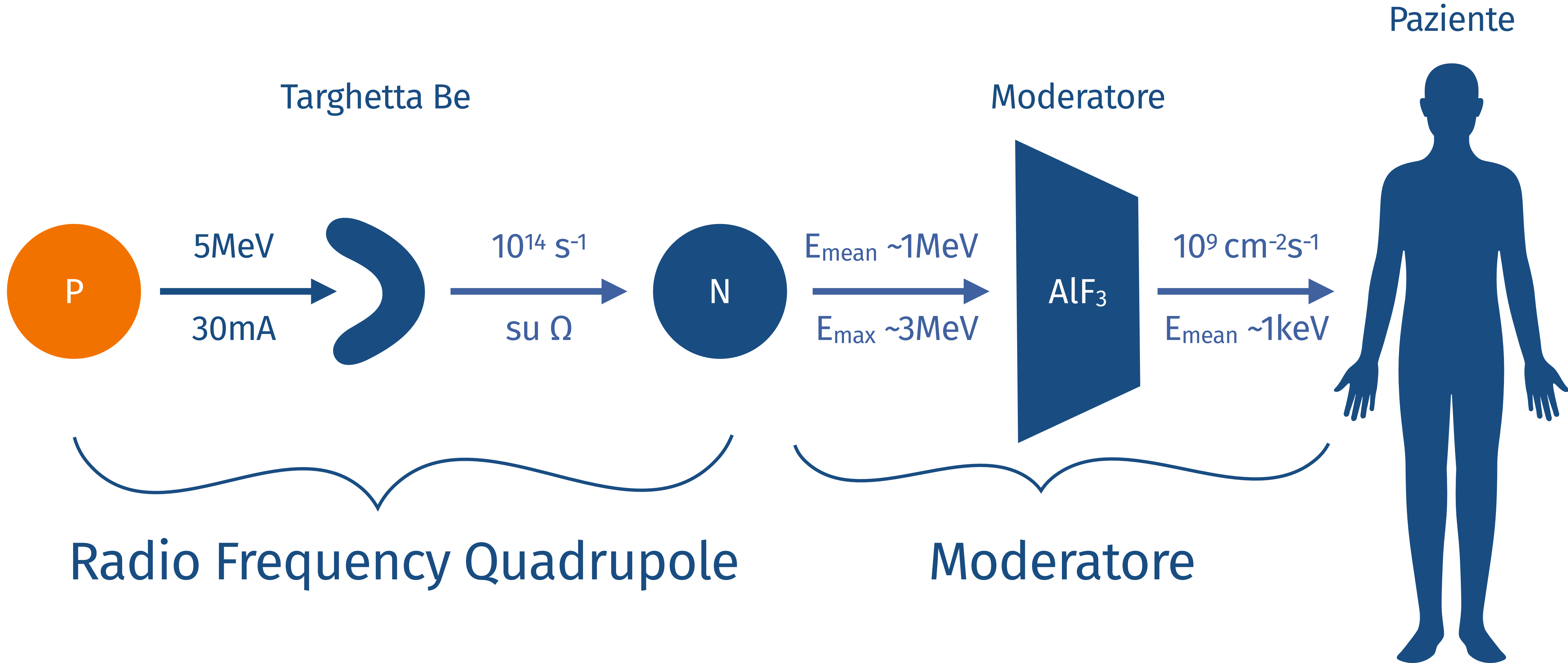




Istituto Nazionale di Fisica Nucleare

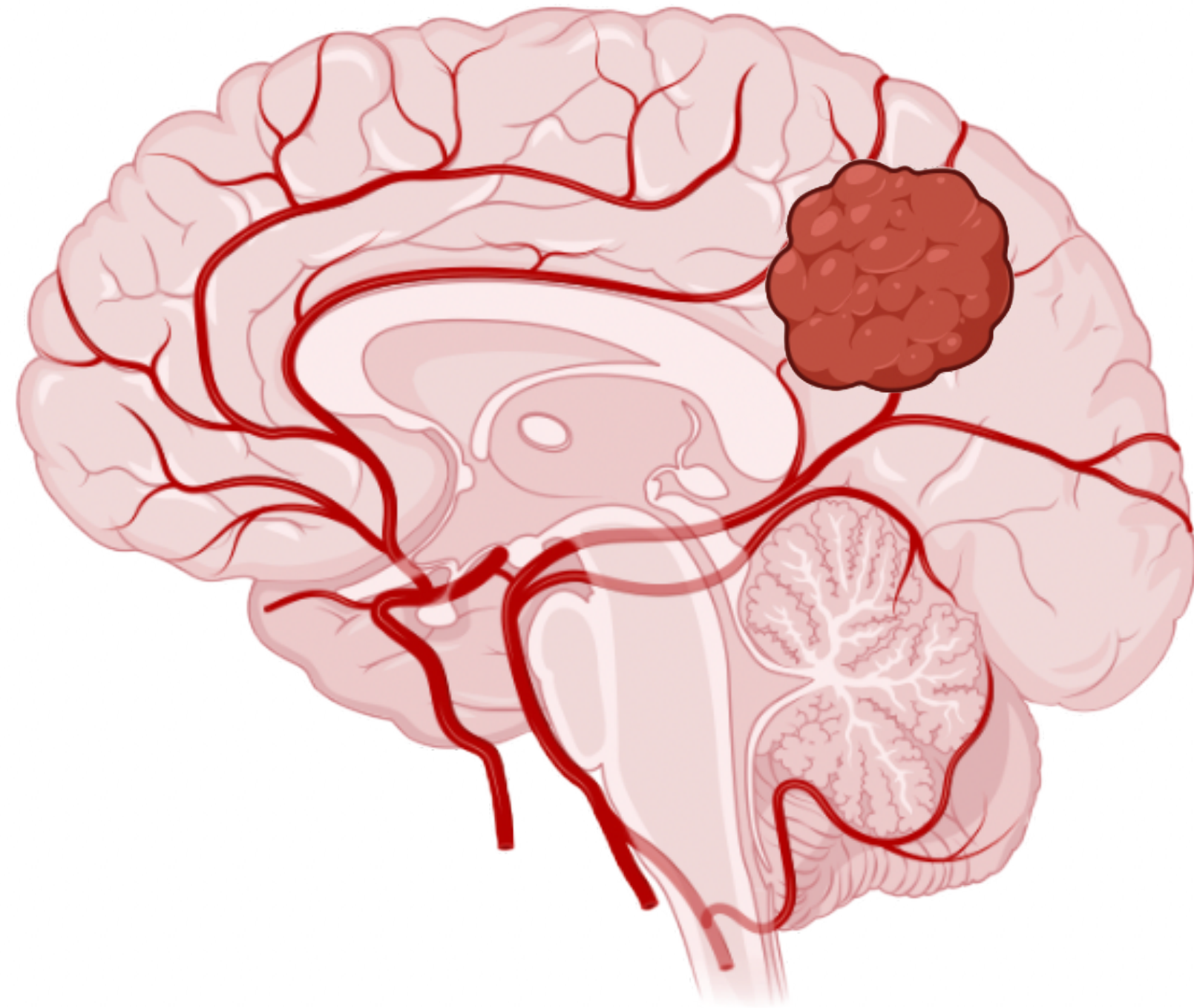


BNCT @ INFN

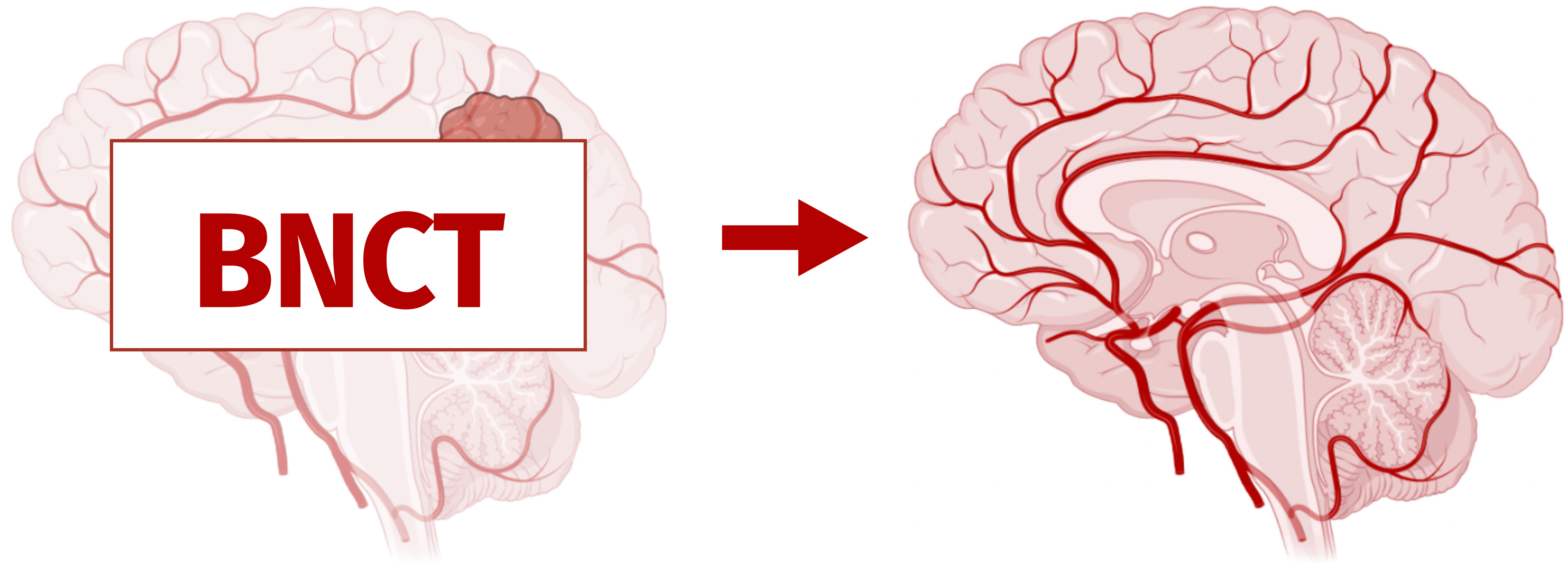


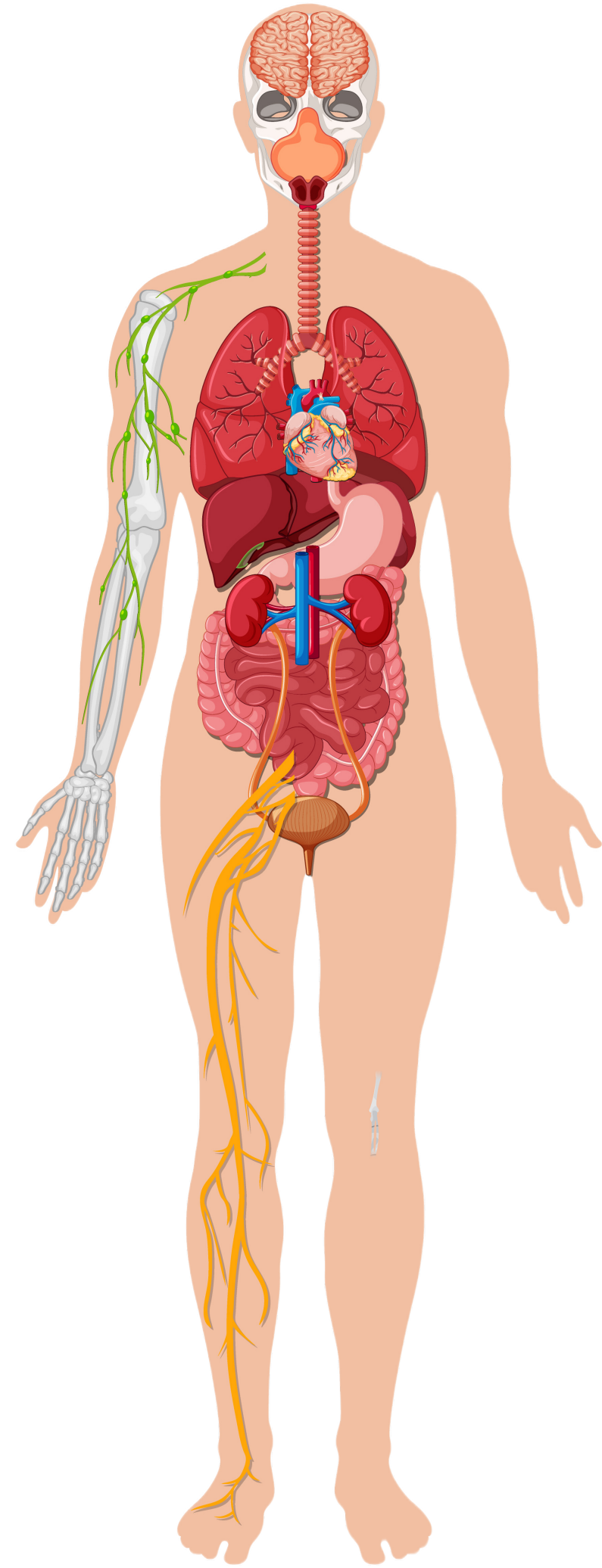


Outcome ideale



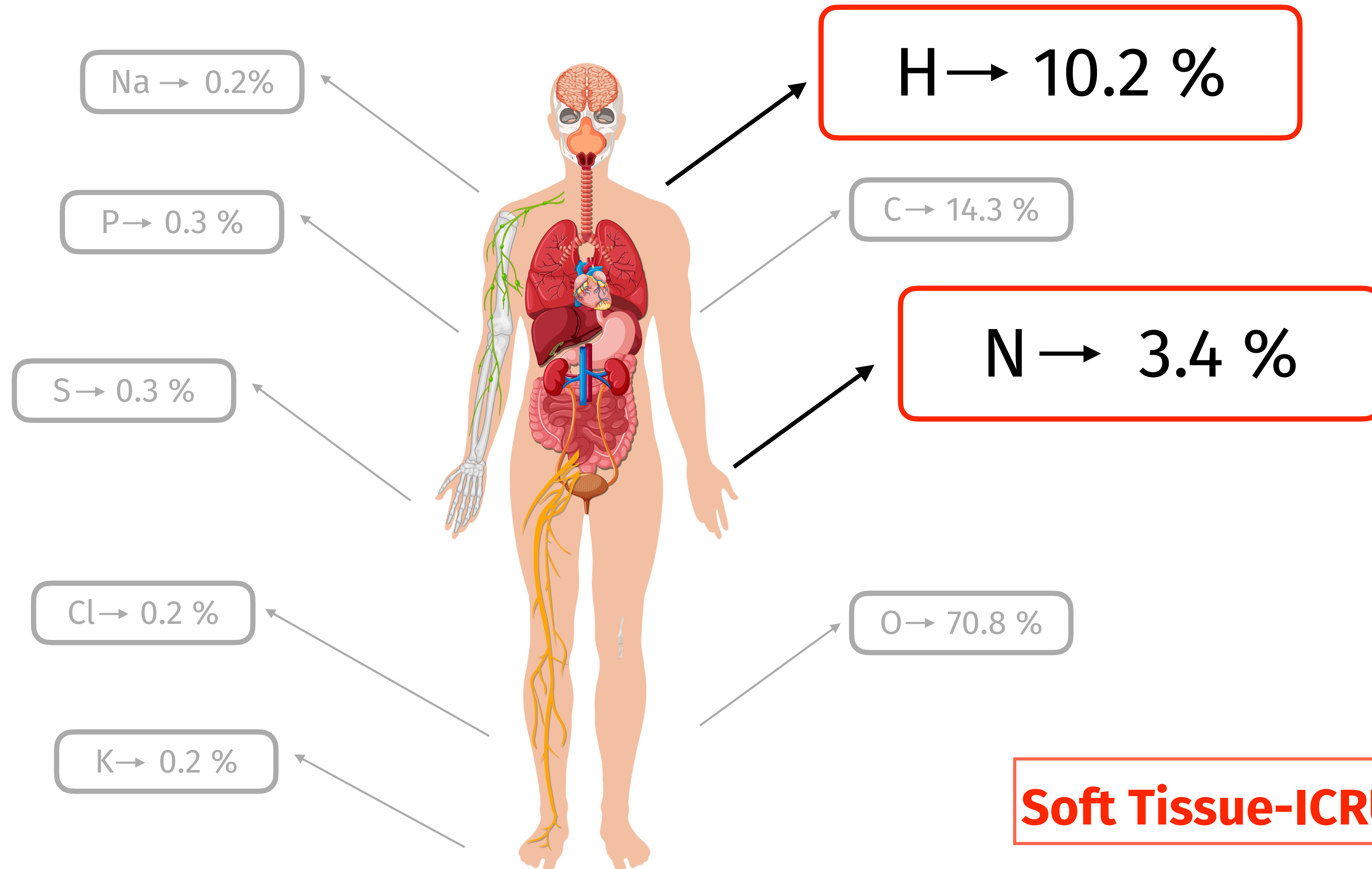
Outcome ideale





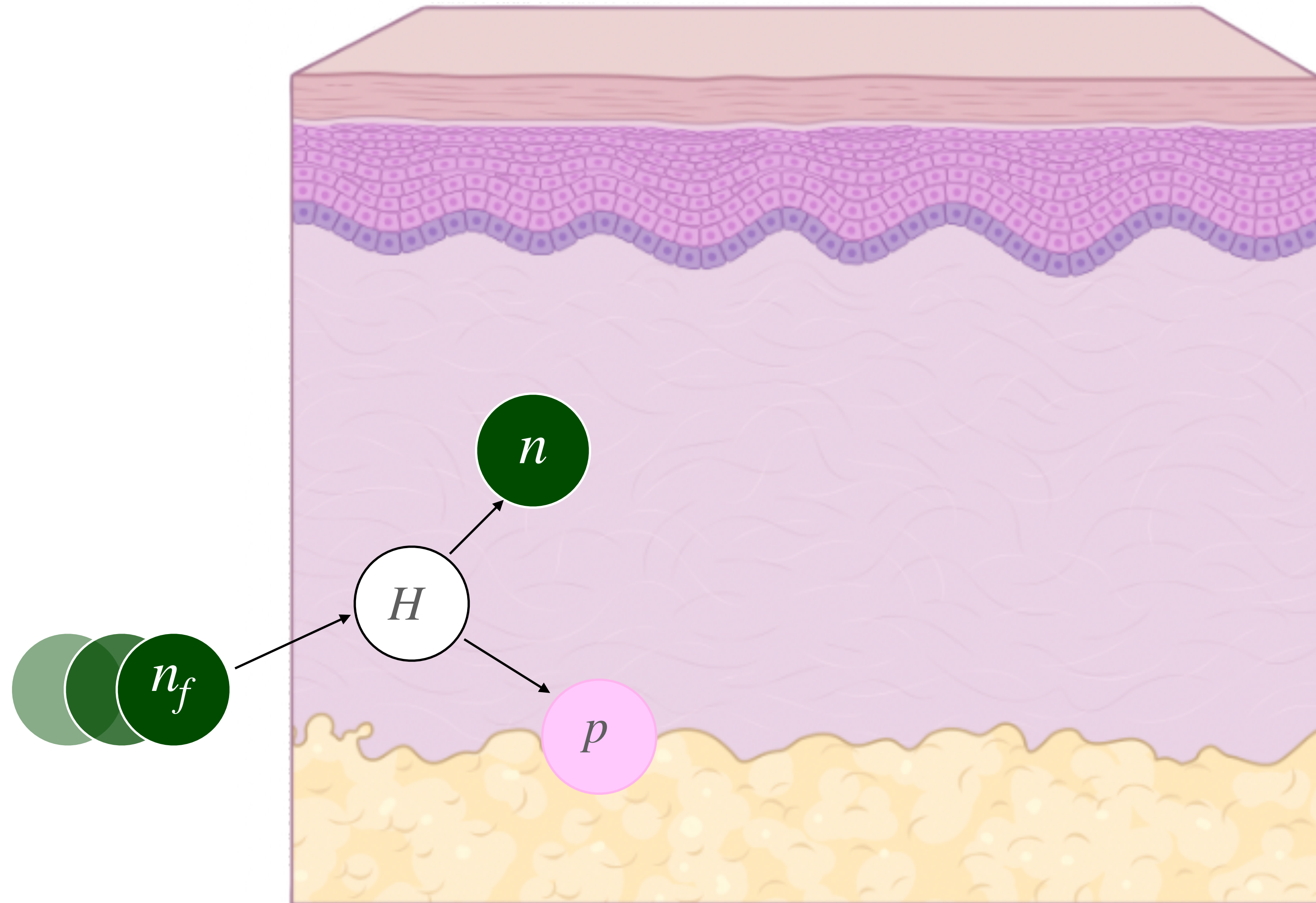
**Nei tessuti c'è
solo il Boro?**

Composizione corpo umano

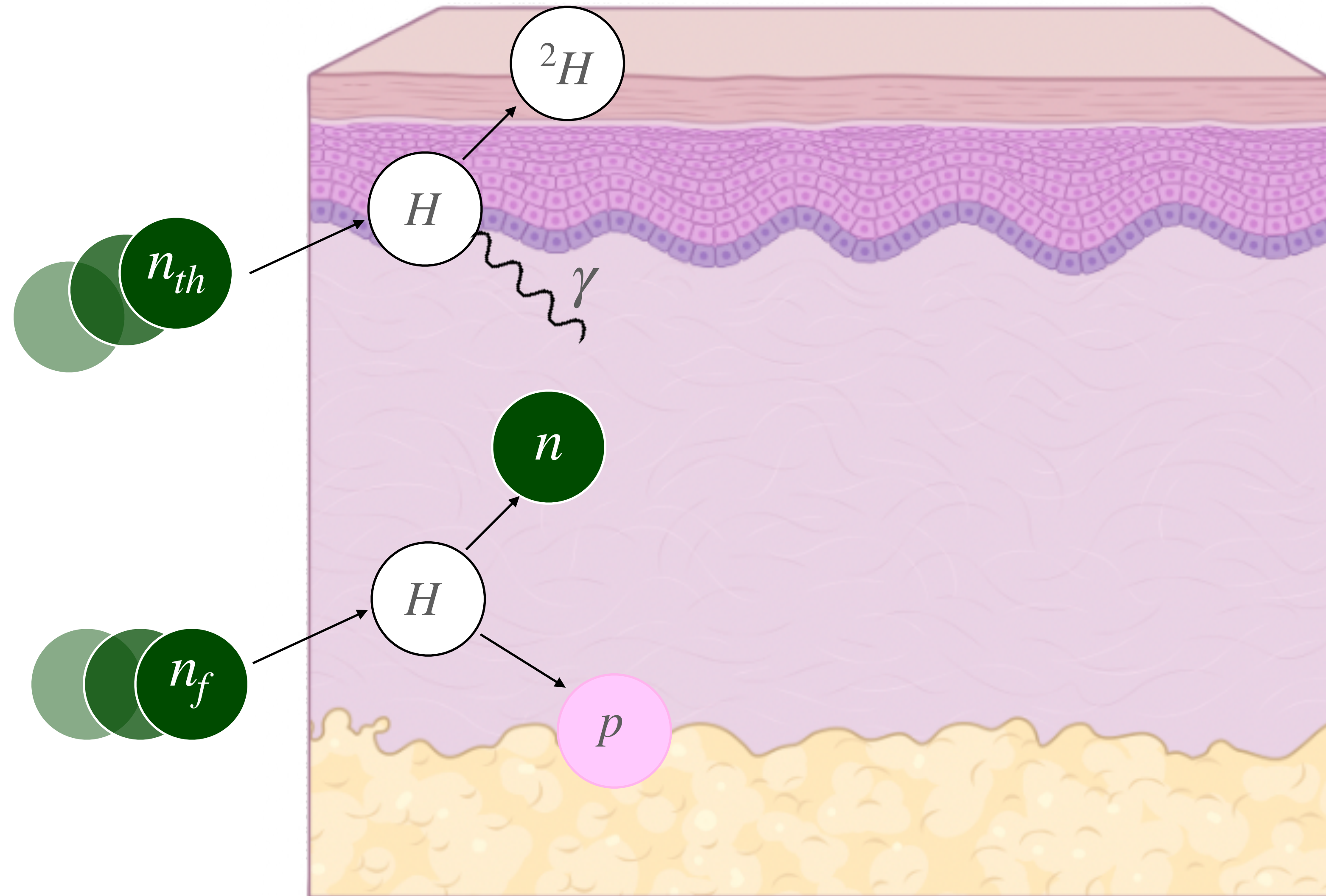


Soft Tissue-ICRU 44

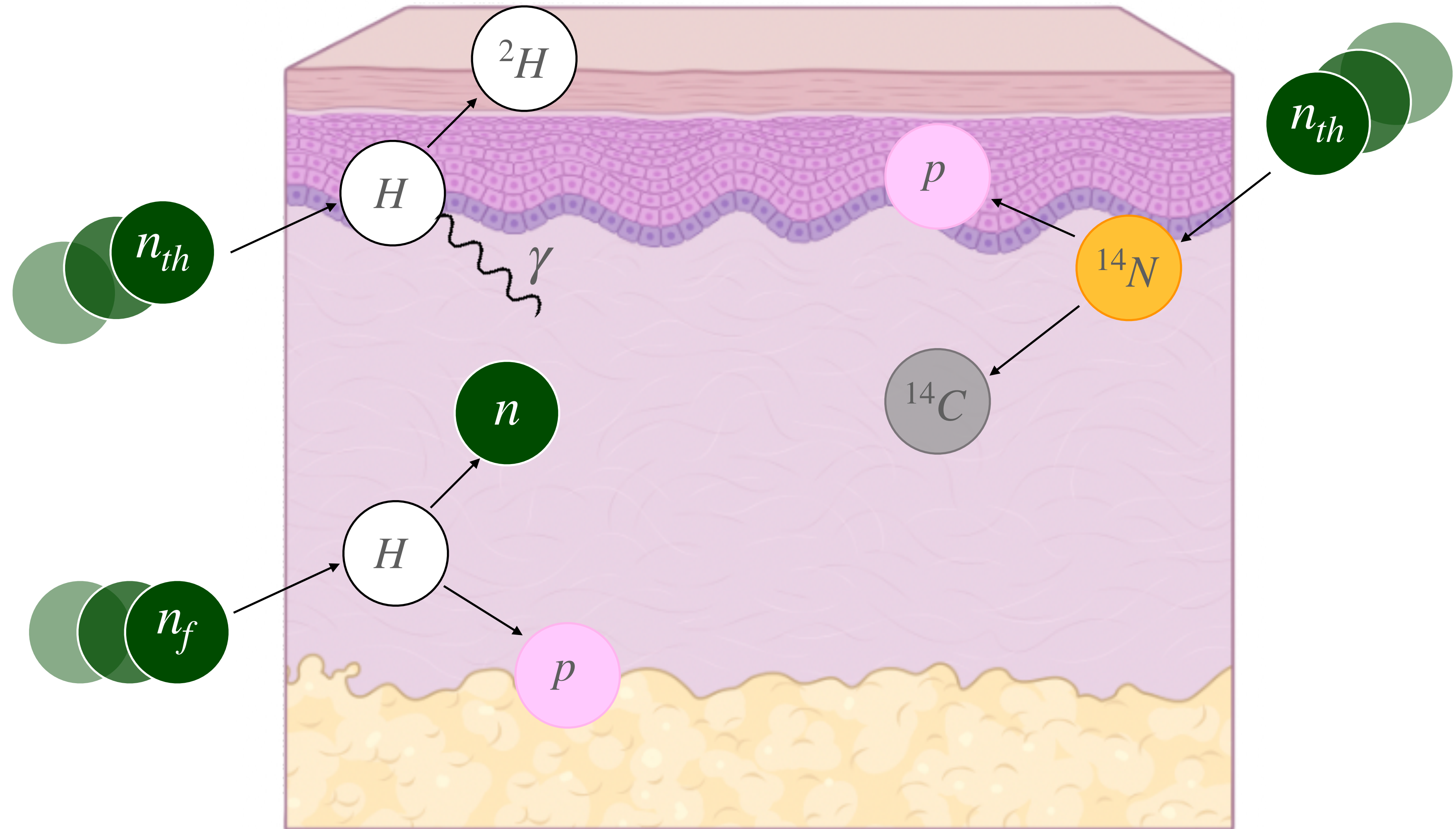
Campo misto di radiazioni



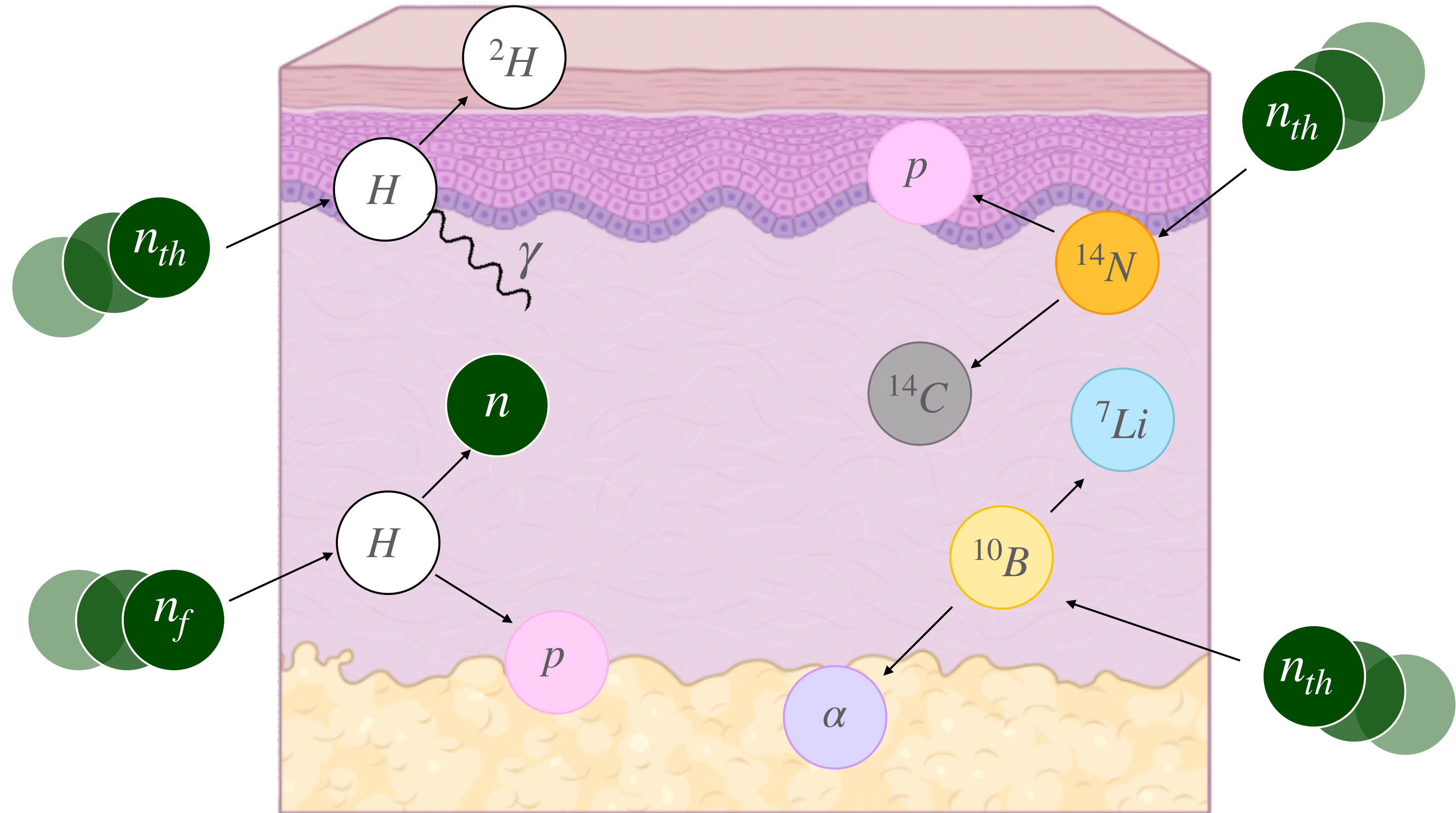
Campo misto di radiazioni



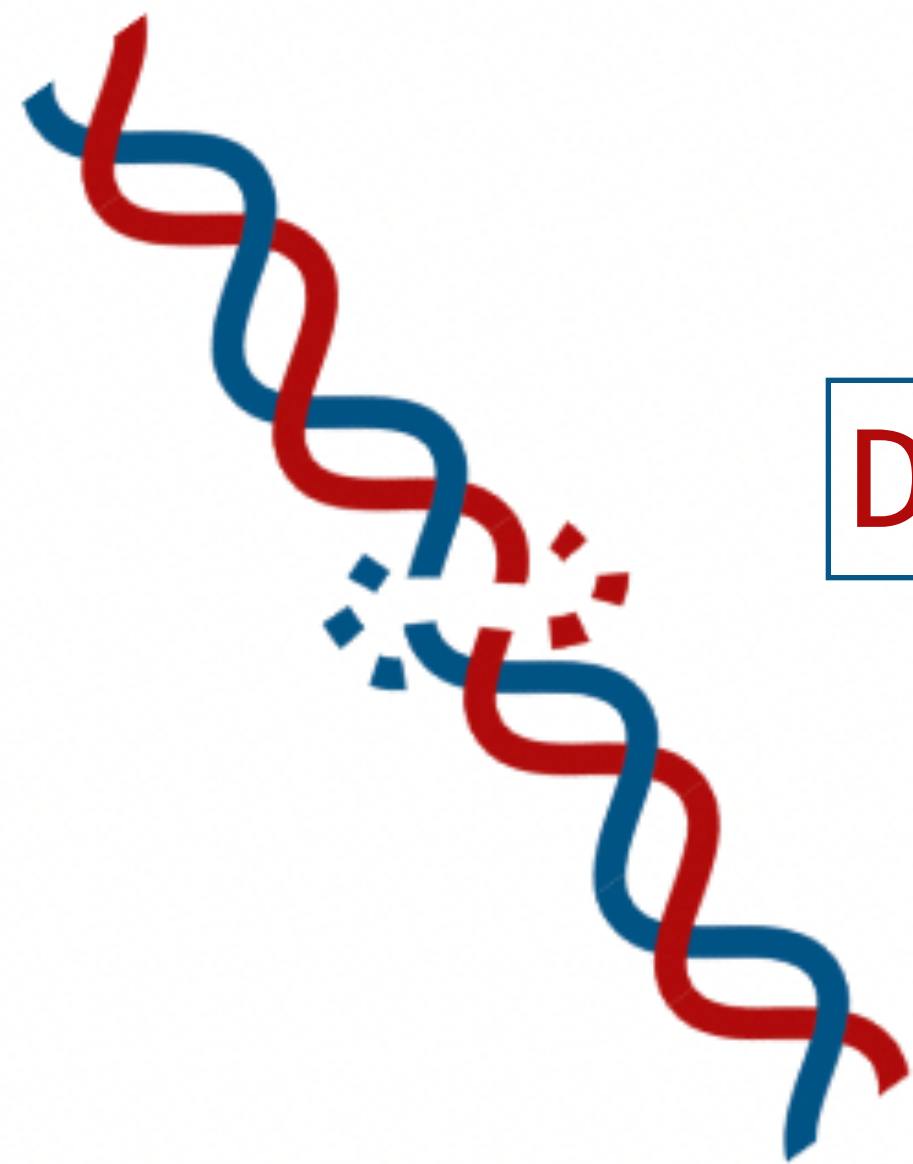
Campo misto di radiazioni



Campo misto di radiazioni



Danni al DNA



Danno complesso



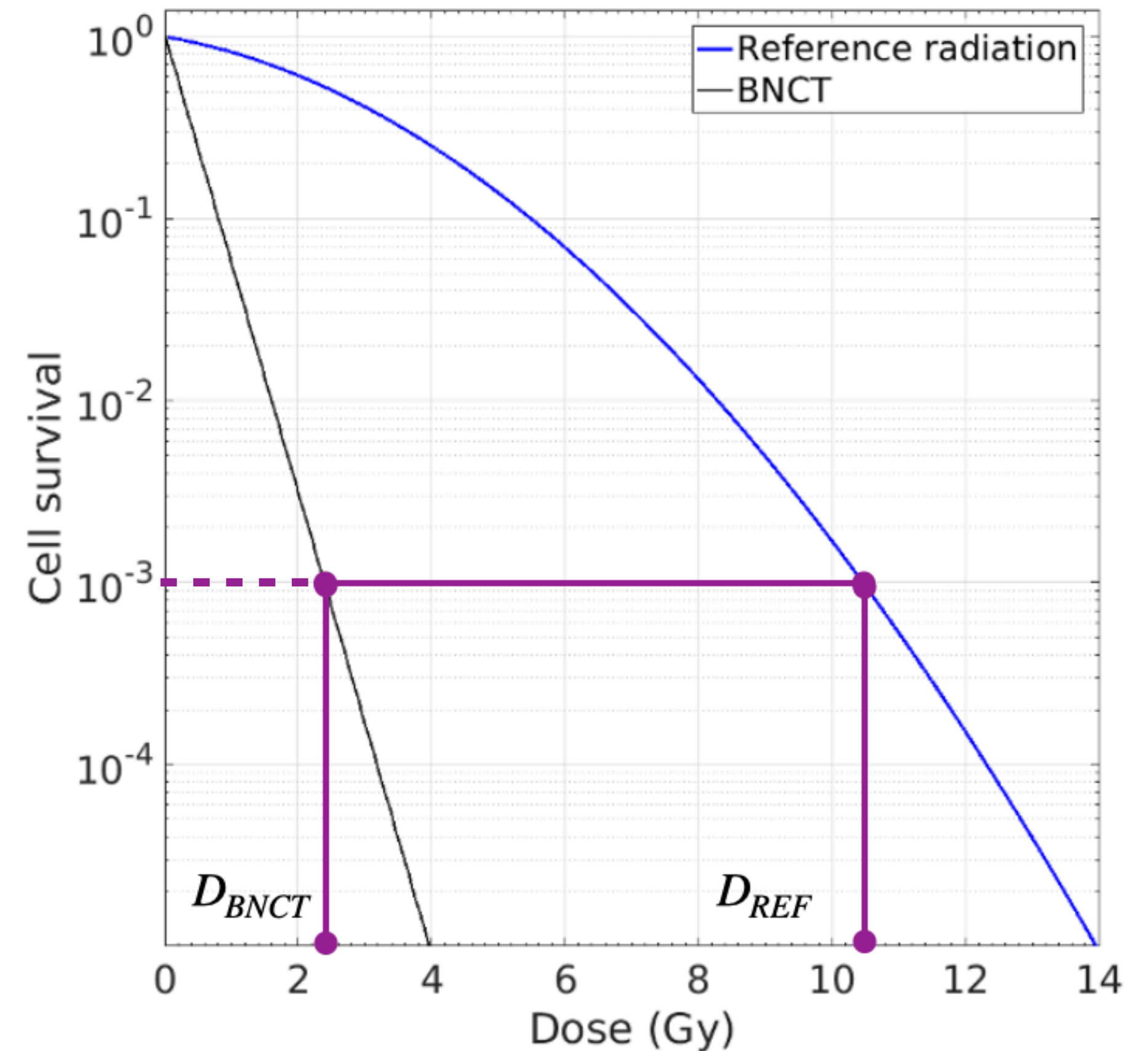
Danno semplice

DOSE

$$D = \frac{\bar{E}}{m} \left[\frac{J}{kg} = Gy \right]$$

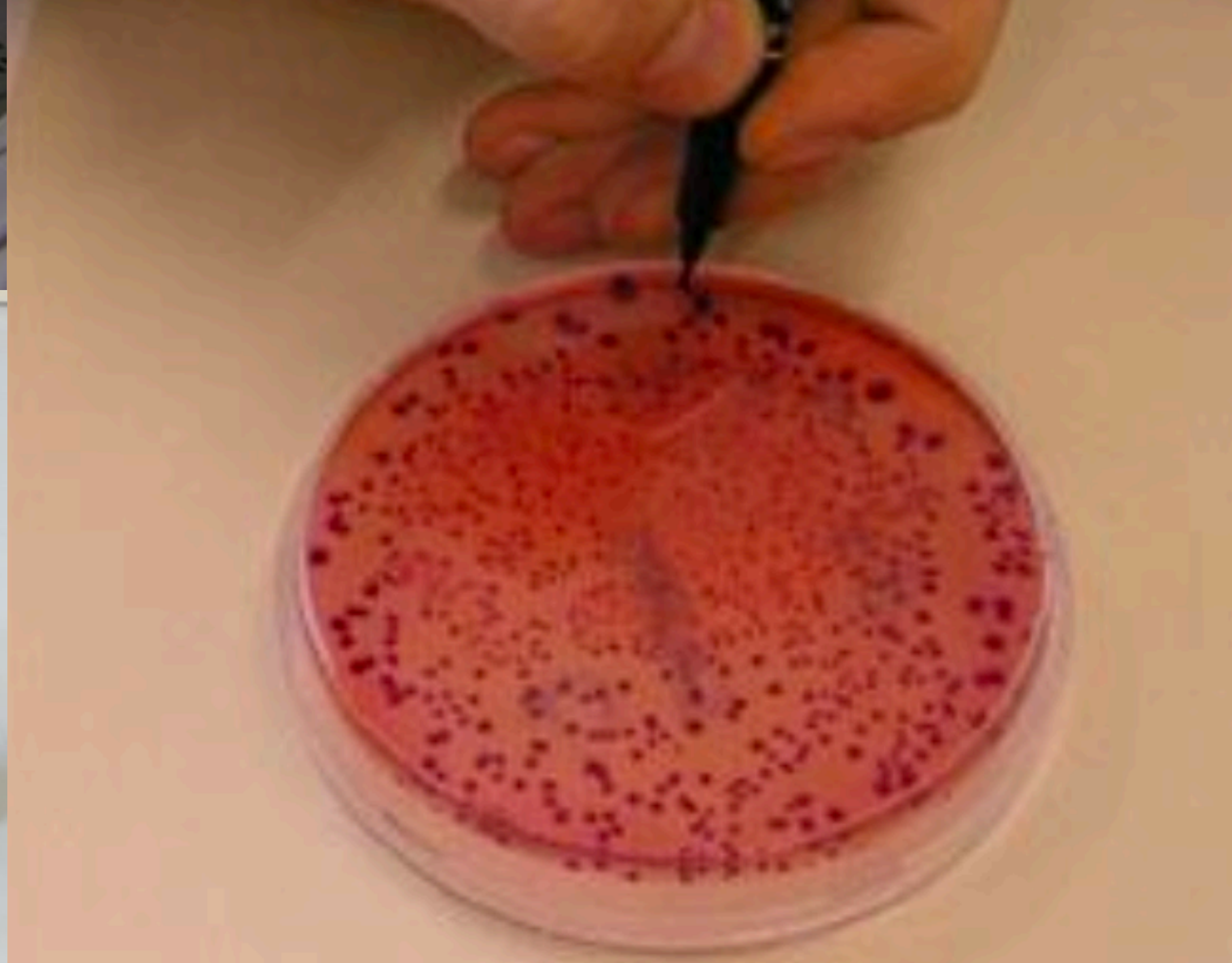
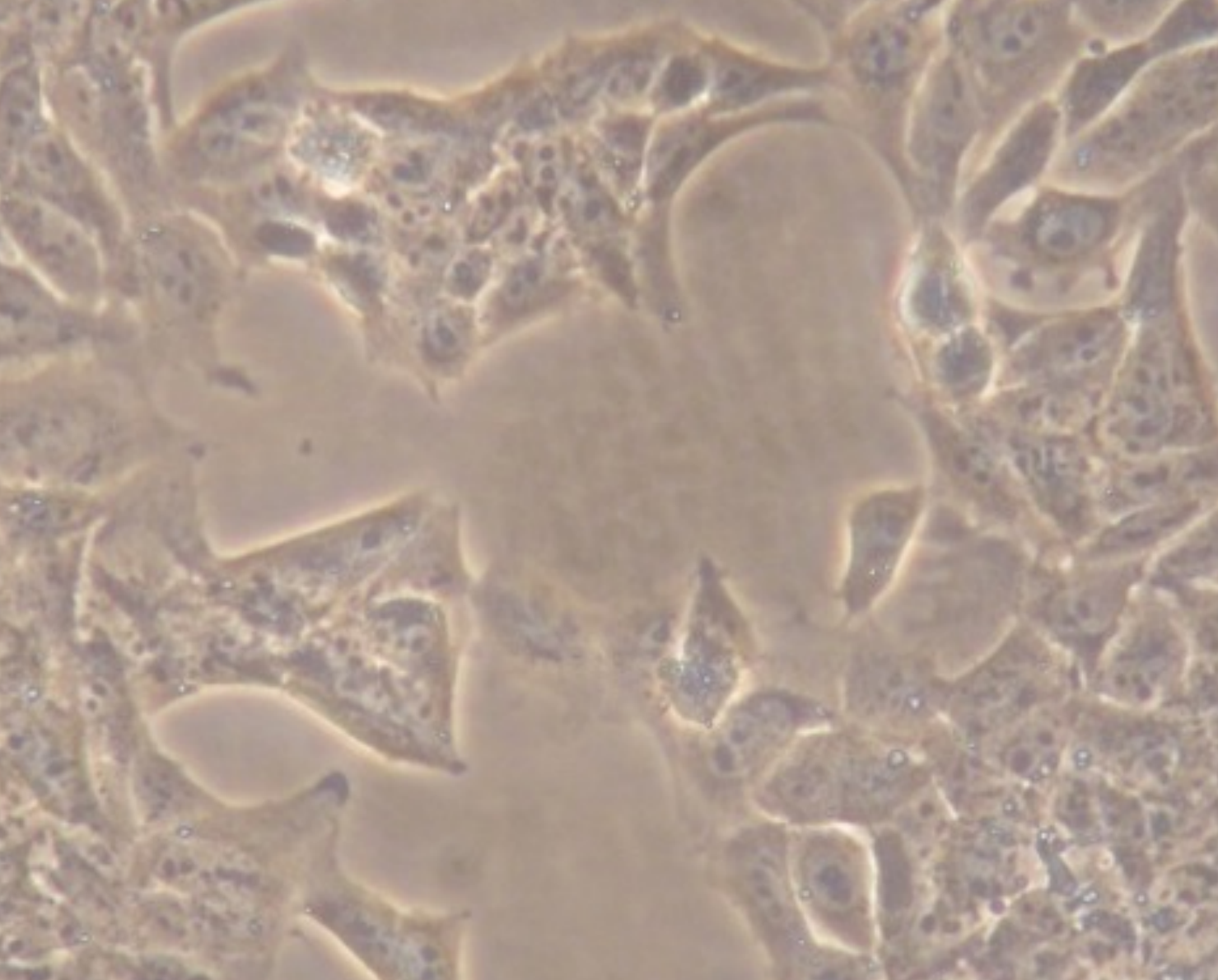
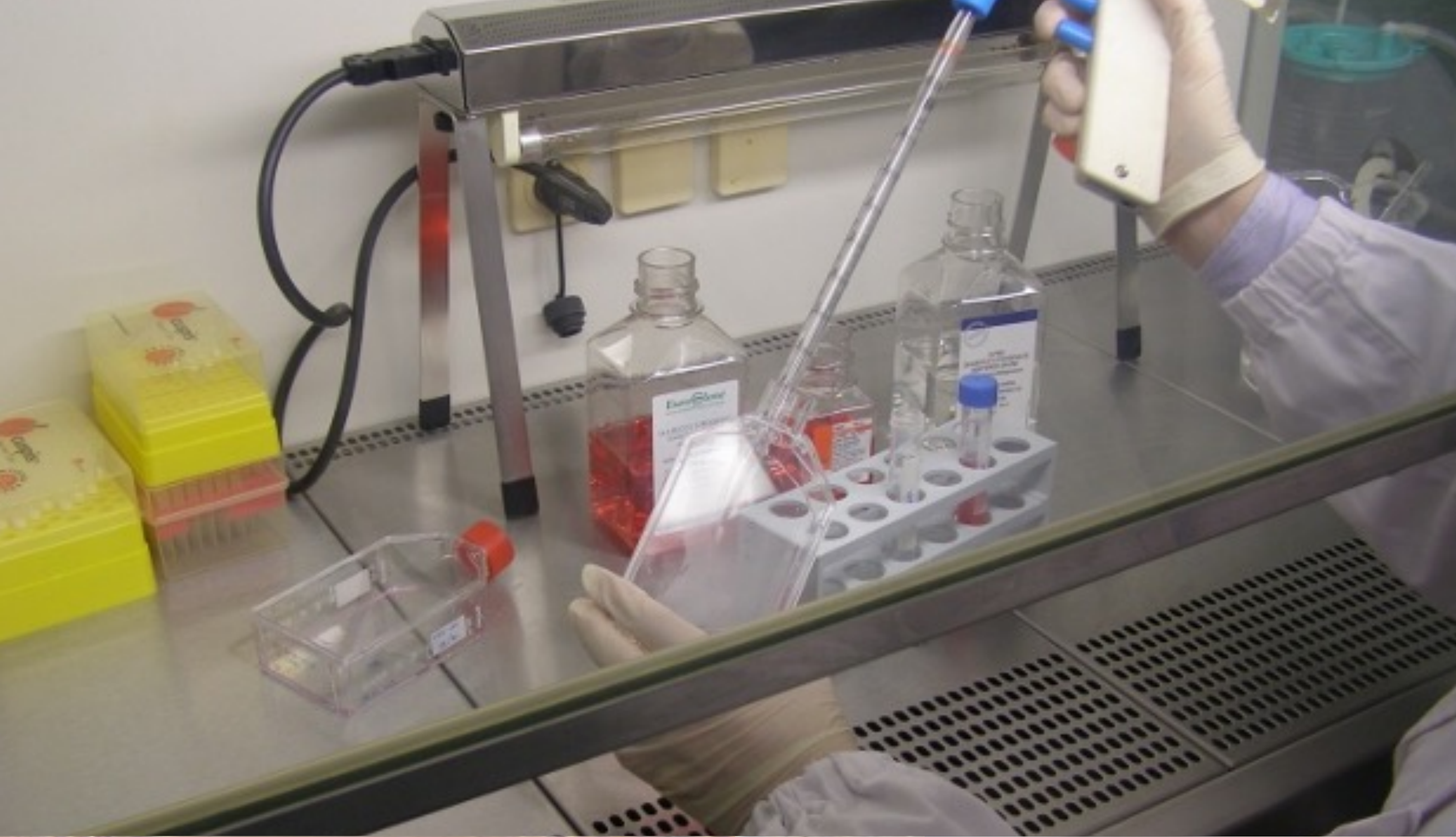
Dose isoeffettiva

D_{ref} = dose di fotoni di riferimento che produce lo stesso livello di sopravvivenza della dose BNCT.

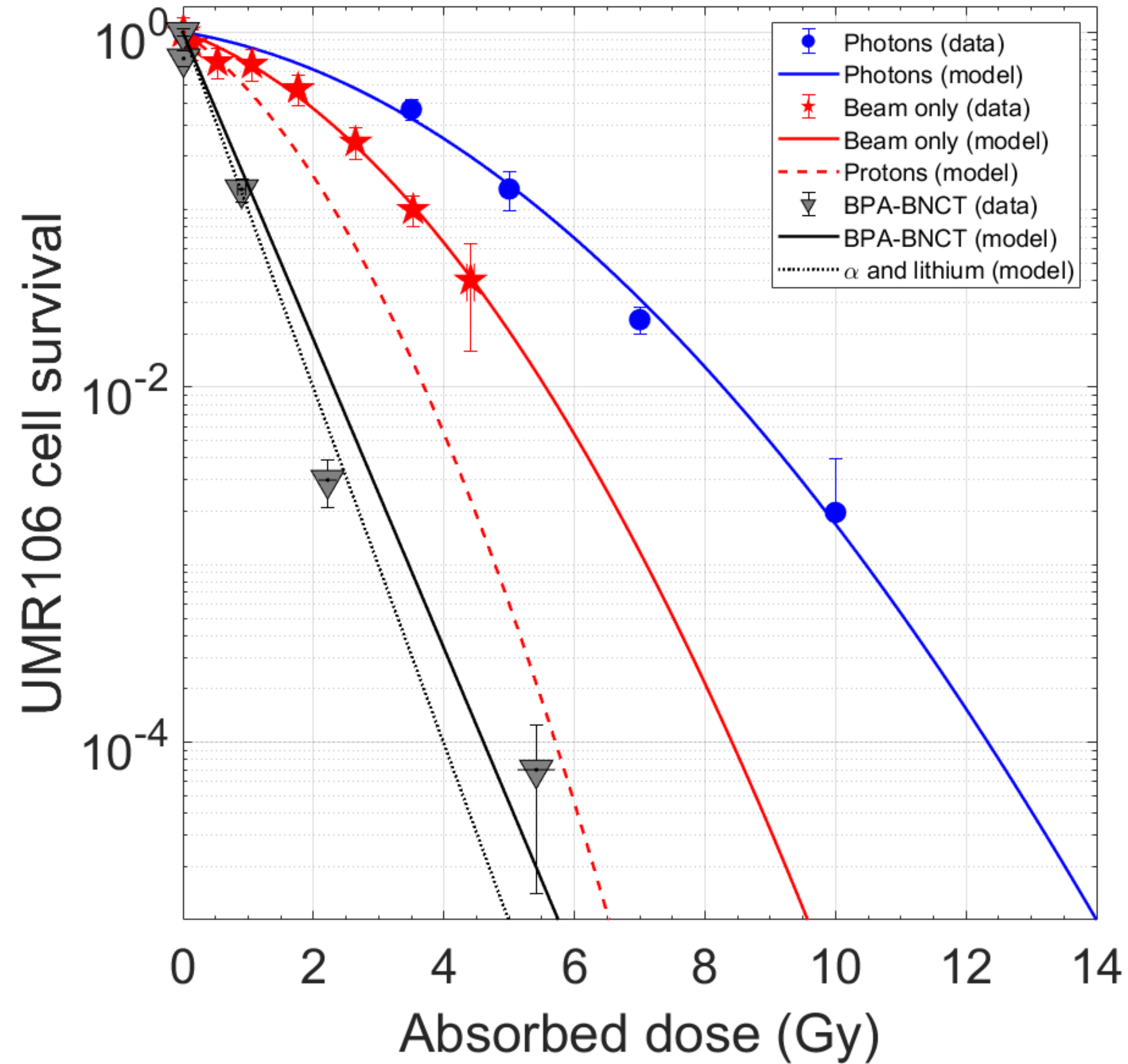


Dose isoeffettiva

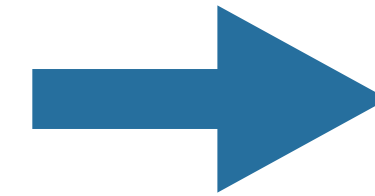
$$D_{ref}(D_1, \dots, D_4) = \frac{\alpha_R}{2G_R\beta_R} \left(\sqrt{1 + \frac{4G_R}{\alpha_R (\alpha/\beta)_R} \left(\sum_{i=1}^4 \alpha_i D_i + \sum_{i=1}^4 \sum_{j=1}^4 G_{ij} \sqrt{\beta_i \beta_j D_i D_j} \right)} - 1 \right)$$



Esperimenti radiobiologici



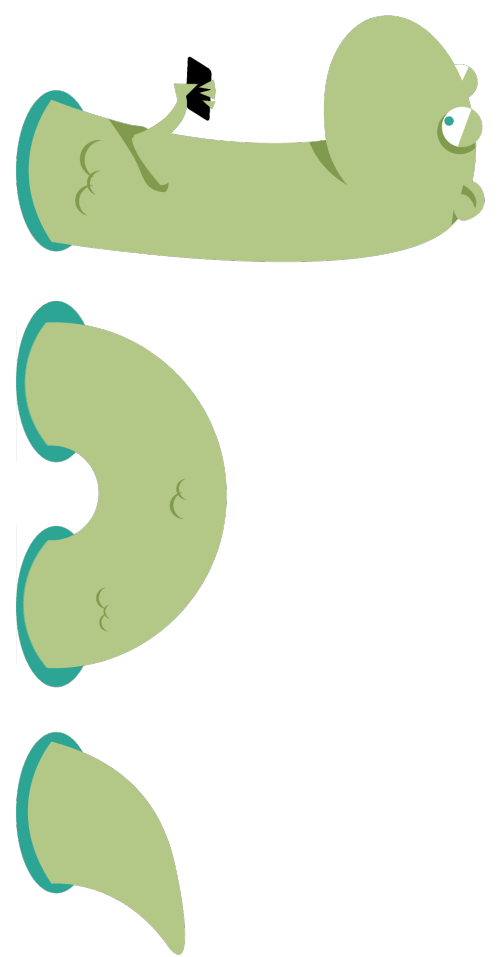
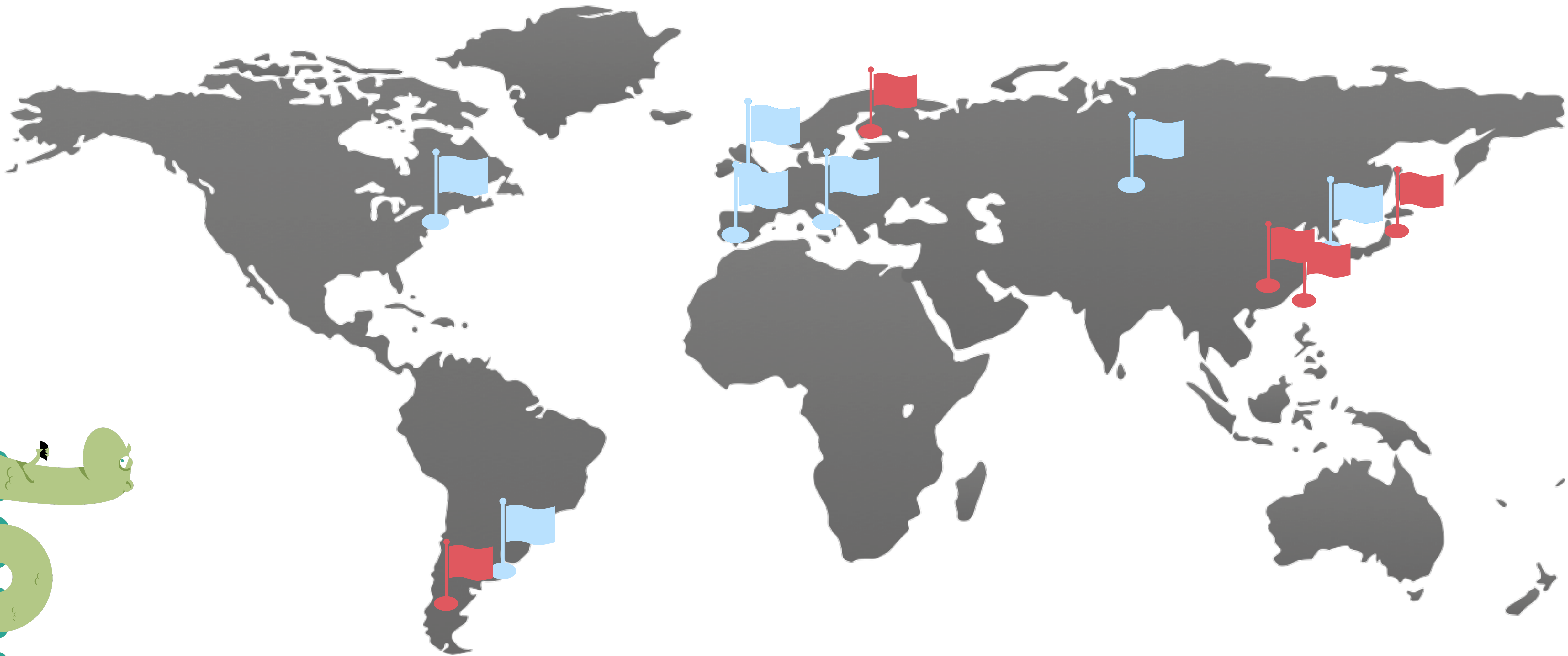
Parametri
radiobiologici



$$\alpha_i, \beta_i$$

Con $i = n_{th}, n_f, Bo e \gamma$

Clinica



Medicina

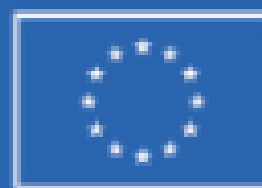
Ingegneria

Chimica

Biologia

Fisica

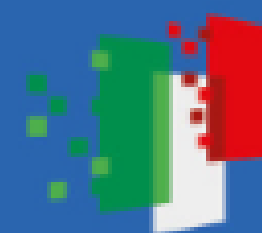




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NextGenerationEU

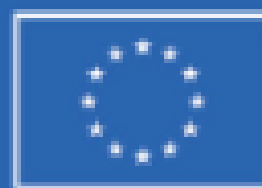


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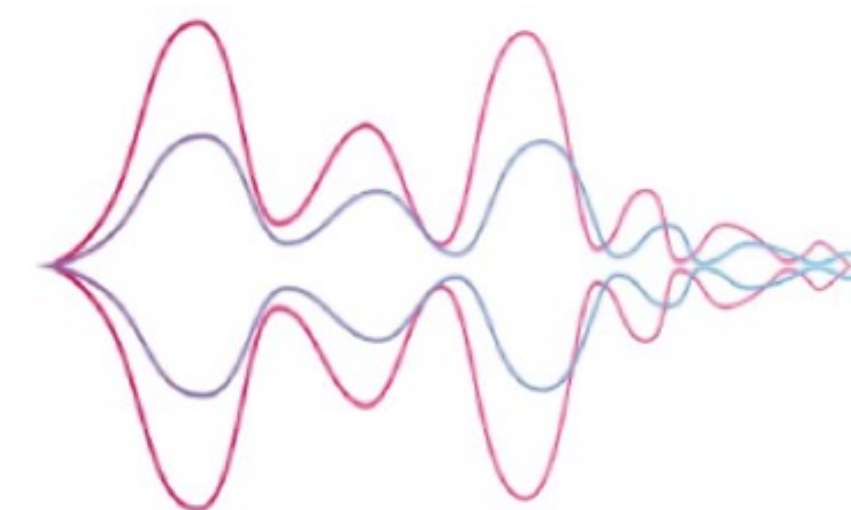
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e della Ricerca



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DI RIPRESA E RESILIENZA

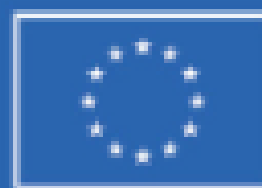


● Università
degli Studi
● della Campania
Luigi Vanvitelli

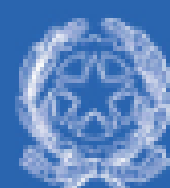


Anthem

AdvaNced Technologies for Human-centEred Medicine



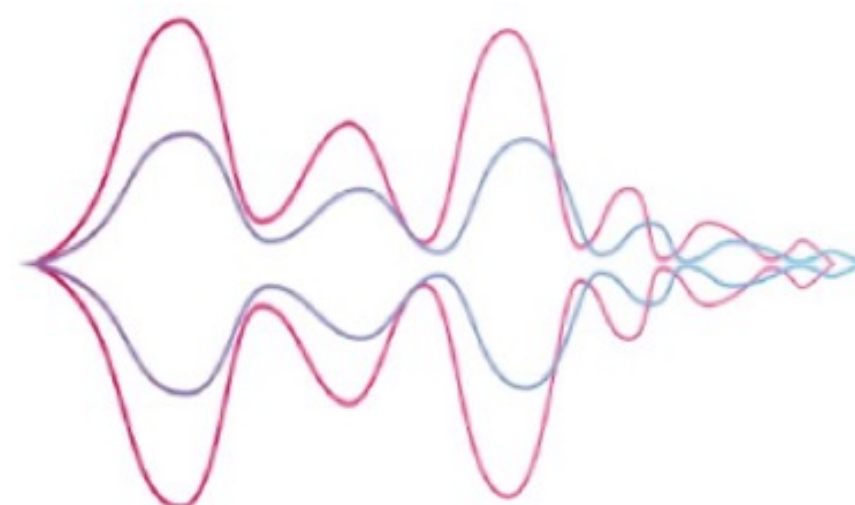
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e della Ricerca



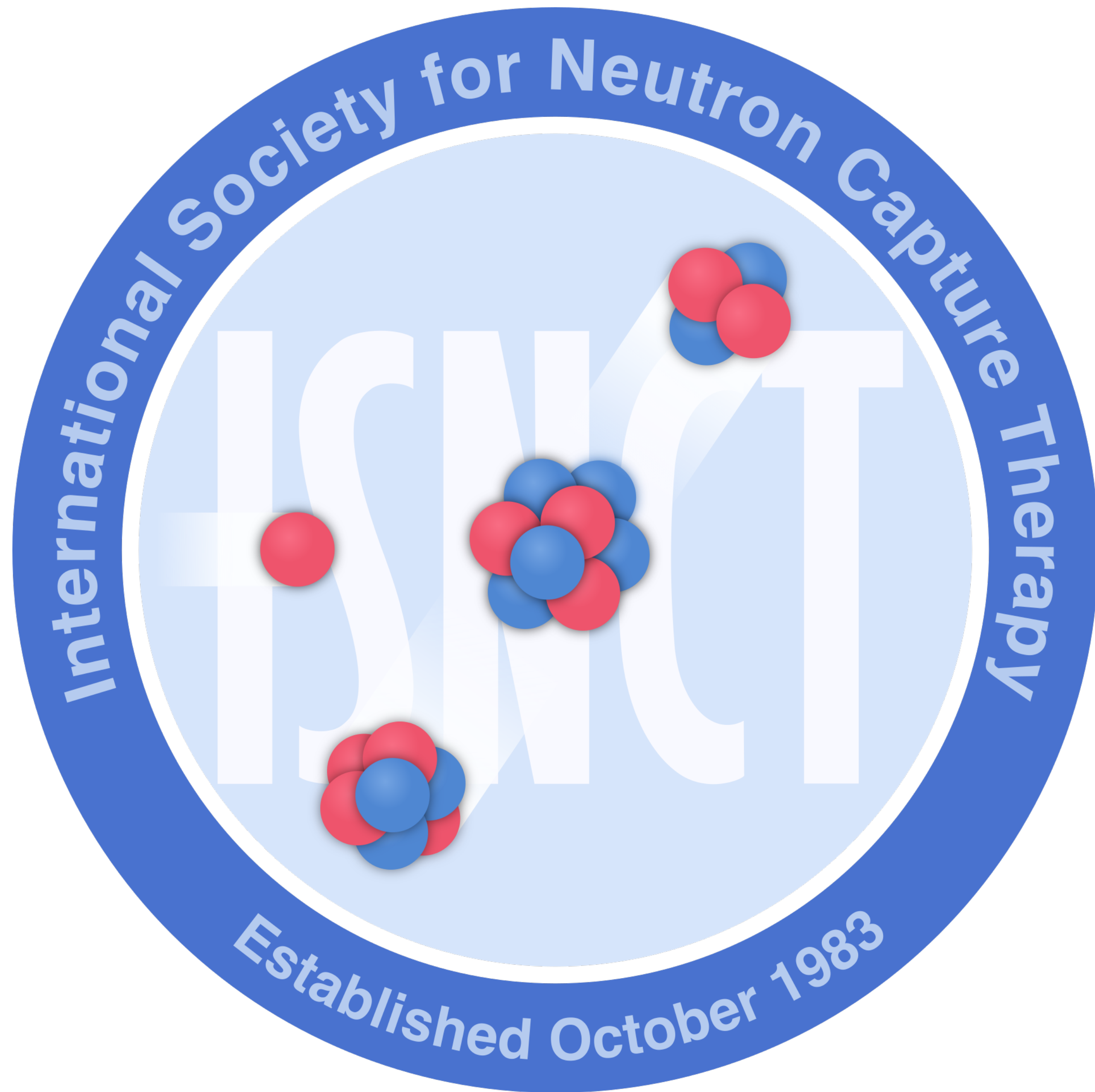
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PIANO NAZIONALE
DI RIPRESA E RESILIENZA



Anthem

AdvaNced Technologies for Human-centEred Medicine

Per la costruzione di un centro clinico da tecnologia INFN
Primo centro totalmente basato su Ricerca Pubblica



seguiteci su
www.isnct.net



Risultati principali

Magni, Chiara, et al. "Design of a BNCT irradiation room based on proton accelerator and beryllium target." *Applied Radiation and Isotopes*

González, S. J., et al. "Photon iso-effective dose for cancer treatment with mixed field radiation based on dose-response assessment from human and an animal model: clinical application to boron neutron capture therapy for head and neck cancer." *Physics in Medicine & Biology*.

Provenzano, L., et al. "The essential role of radiobiological figures of merit for the assessment and comparison of beam performances in boron neutron capture therapy." *Physica Medica*.

Postuma, Ian, et al. "A Novel Approach to Design and Evaluate BNCT Neutron Beams Combining Physical, Radiobiological, and Dosimetric Figures of Merit." *Biology*.

Viegas, Ana Mailén Dattoli, et al. "Detailed dosimetry calculation for in-vitro experiments and its impact on clinical BNCT." *Physica Medica*.

Perotti Bernardini, Giuliano Franco, et al. "Comparison of Photon Isoeffective Dose Models Based on In Vitro and In Vivo Radiobiological Experiments for Head and Neck Cancer Treated with BNCT." *Radiation Research* 198.2 (2022): 134-144.

Immagini usate

Immagine di <https://www.andreadama.com/costruire-un-team-di-lavoro/>

<https://www.nu.nl/binnenland/6181946/stilleggen-kernreactor-petten-heeft-mogelijk-grote-gevolgen-voor-kankerpatienten.html>

<https://acceleratori.infn.it/index.php/it/>

<https://www.freepik.com>