1 | **The need for customised therapies**

**Immunotherapies** have emerged as effective treatments for cancer or inflammatory diseases. However, these treatments face obstacles that hinder their broad application in the clinic.

The **effectiveness of immunotherapies** depends on factors such as the modulation of the immune system or the patient’s specific pathology. Therefore, the patient’s response to an immunotherapy can be very variable.

As a consequence, **immunotherapies have to be personalised** to improve their outcome. To fulfil this need, practitioners must assess the immune status of the patient both at the disease sites and at a systemic level.

Current diagnosis techniques cannot provide this information at both scales. **Tissue biopsies** do not always shed light on the overall immune status, while **blood-based biomarkers** do not provide spatial information of the disease site. Thus, **personalised dosing and outcome prediction are sub-optimal**.

**Molecular imaging** (PET, MRI and DI) has the potential to overcome this limitation, as it allows to assess the immune status of the patient at both dimensions and in a **non-invasive manner**, but **novel immunotracers are required** to get the most out of these techniques.

2 | **Immune-Image at a glance**

The Immune-Image project aims to develop and implement a **novel non-invasive molecular imaging platform** for **assessing immune cell activation and dynamics** in oncology and inflammatory diseases, both in animal models and in patients.

The project brings together **22 leading entities across 9 countries** to achieve this goal, including **academic and medical institutions, pharmaceutical companies** and a **patient organisation**.

**Our methods**

- Develop, optimise and validate existing and novel immune cell-specific imaging probes.
- Establish imaging protocols hybrid imaging workflows and imaging software.
- Prepare the regulatory framework for clinical trials using imaging approaches to manage immunotherapies.
- Conduct human clinical trials to confirm the safety and the clinical potential of immunotracers.

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**Novel immunotracer platform to image immune cell dynamics**
3 | **Towards a smart monitoring of immunotherapies**

Immune-Image will set up a flexible platform for molecular imaging through a **systematic approach to immunotracer selection**. The goal is to obtain clinically validated immunotracers and ready-to-use molecular imaging platforms.

- **Generation of cell type specific immunotracers**
  Immune-Image will perform an exhaustive research to identify and describe cellular membrane receptors, targeting moieties and labels that can be exploited and combined to track many cellular subtypes.

- **Imaging technique development and optimisation**
  The project will determine the optimal imaging modality for each immunotracer and will develop quantitative imaging protocols for them.

- **In vivo selection, validation and safety**
  Immunotracers will be evaluated in vivo using rodent models (including humanised rodents) and non-human primate (NHP) models.

- **Clinical trials**
  The Immune-Image project will perform clinical trials to evaluate the immune system status and to confirm the safety and efficacy of the immunotracers. Particularly, immunotracers targeted to oncologic and inflammatory diseases will be evaluated.

4 | **An approach with many impacts**

- **Advancing on the field of immune cells imaging**
  The project will deliver a systematic immunotracer generation platform that will be able to produce immunotracers with desired characteristics. This will **boost the customisation** of the imaging diagnosis.

- **Improving clinical and healthcare practice**
  This novel molecular imaging strategy, along with biomarker data, will serve to improve the **prediction of the response** to immunotherapies and will enable the selection of tailored treatments.

- **Boost and optimise drug discovery**
  The selected immunotracers will reduce ambiguity in the evaluation of immunotherapies, thus **cutting down in duration and costs of drug development**. Moreover, it will **facilitate the design of new drugs**.

- **Enhancing basic and translational research**
  The standardised protocols will **improve our understanding of immunotherapies** and the identification of new molecular pathways. In addition, Immune-Image will facilitate R&D targeted to many diseases.

5 | **Funders & partners**

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**Consortium**

- **Funders & partners**
  - European Commission
  - EFPIA

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Website [www.immune-image.eu](http://www.immune-image.eu)