Cancer Immunogram: combining multi-parameter approach and machine learning to capture the complexity of tumor immune contexture

To tailor clinical care and personalized treatment of cancer patients, the scientific community together with the practitioners have focused into refining our understanding of cancer biology and resistance to treatments. The concept of Immunoscore® has highlighted the crucial role of immune response to the tumor. In this context, the comprehensive identification and assessment of multiple factors could be key to stratify patients and allow the selection of the optimal treatment.

Here, we consolidate our Proof of Concept for the Cancer Immunogram in CRC by leveraging this meta-analysis on a 33-patients cohort. Using machine learning algorithms to extract the most relevant features, we show that the Cancer Immunogram allows to identify patterns which might improve the prediction of the response to therapies. We believe that the Cancer Immunogram has the potential to facilitate drug development by providing a 360° vision of the tumor immune contexture and may also help clinicians to personalize advanced cancer patient care.

**Methods**

**Background**
To tailor clinical care and personalized treatment of cancer patients, the scientific community together with the practitioners have focused into refining our understanding of cancer biology and resistance to treatments. The concept of Immunoscore® has highlighted the crucial role of immune response to the tumor. In this context, the comprehensive identification and assessment of multiple factors could be key to stratify patients and allow the selection of the optimal treatment.

Here, we consolidate our Proof of Concept for the Cancer Immunogram in CRC by leveraging this meta-analysis on a 33-patients cohort. Using machine learning algorithms to extract the most relevant features, we show that the Cancer Immunogram allows to identify patterns which might improve the prediction of the response to therapies. We believe that the Cancer Immunogram has the potential to facilitate drug development by providing a 360° vision of the tumor immune contexture and may also help clinicians to personalize advanced cancer patient care.

**Tumor Characteristics**

**T Cell Exhaustion**

**Immunosuppression**

**Immunoscore® IC**

**Panel quantification**

**Cytotoxic Response**

**CD8 staining**

**Patients Immunogram**

**Conclusions and Perspectives**

Here, we establish the Cancer Immunogram in the context of CRC by combining the following technologies and biomarkers: IO Sequencing (TMB, MSI, T Cell Clonality), Immunoscore® TL (Imune Cell Infiltration), Immunoscore® IC (Immune Gene Expression Signatures), Immunoscore® IC (dual PD-L1 and CD8 staining), Immunoscore® SC (T-Cell Exhaustion, MDSC, TIM-3, LAG-3, CD163, CD204, CD206, CD86 and CD68 staining). Using Artificial Intelligence, the Cancer Immunogram can guide therapies aiming at restoring the full potential of patient’s immune response and help to decipher that results of clinical trials.