*Article*

# Multi-omics Characterization of Response to PD-1 Inhibitors in Advanced Melanoma

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**Simple Summary:** The survival of advanced melanoma patients has been improved in recent years due to immunotherapy. However, not all patients respond to this treatment. For this reason, it is necessary to know the mechanisms of the response and resistance to immunotherapy. In this work, clinical samples from advanced melanoma patients treated with immunotherapy were analyzed. The obtained results suggested that the proteins involved in protein processing in the endoplasmic reticulum and antigen presentation, as well as the immune and inflammatory responses, play a role in the response to immunotherapy. Additionally, we built a prognostic signature capable of identifying those patients that will respond to immunotherapy. The study of the mechanisms of the resistance and response to immunotherapy could help in the definition of new therapies for these patients that do not respond to immunotherapy.

**Abstract:** Immunotherapy improves the survival of patients with advanced melanoma, 40% of whom become long-term responders. However, not all patients respond to immunotherapy. Further