**Lay Description of Important Outcomes**

We have performed proof-of-concept studies towards the development of a technology that can be used to predict which patients can benefit from immunotherapy. The principle of the assay is based on treating a small sample of the actual tumor instead of the patients themselves and drawing conclusions on how effective a particular immune-based therapy could be. The use of this technology upon its further development could offer evidence-based guidance for the delivery of personalized therapies and spare the non-responsive patients of overtreatment. During the first year of funding, we have optimized parameters of the assay set-up and tested various combinations of immunotherapy plus chemotherapy. Our molecular analysis revealed a novel target that is induced by checkpoint inhibitors which could be evaluated in future studies as a candidate therapeutic. In parallel we have devised a new diagnostic approach that can be used to determine whether a tumor is

“Immunologically hot” and as such whether the patient might be a good candidate for immunotherapy.