EliSpot – a game changer in transplant diagnostics

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Background

Individual Immunotherapy for transplantation patients has been moved more and more into the focus of transplant centers, as individualized therapy approaches enable to minimize long-term side effects and increase the quality of life for the patients.

In a European multicenter study, the Bio-DrIM project, the use of the Enzyme-Linked ImmunoSpot assay (EliSpot) has been extensively evaluated with regard to monitor viral (Epstein-Barr Virus, EBV; Human Cytomegalovirus, HCMV and BK Virus, BKV) infection and reactivation during immunosuppressive therapy after transplantation as well as determination of high- and low responders to donor splenocytes.

Objectives

With this overview we want to show that t cell immune reaction against transplantation-related infections as well as alloreactive t cells are promising tools for individual immunosuppressive therapies for patients.

Methods

An EliSpot assay has been used for the detection of interferon gamma releasing t cells after stimulation with peptide pools from EBV; HCMV and BK-Virus. The Allo-EliSpot was performed with recipient PBMCs stimulated with donor splenocytes.

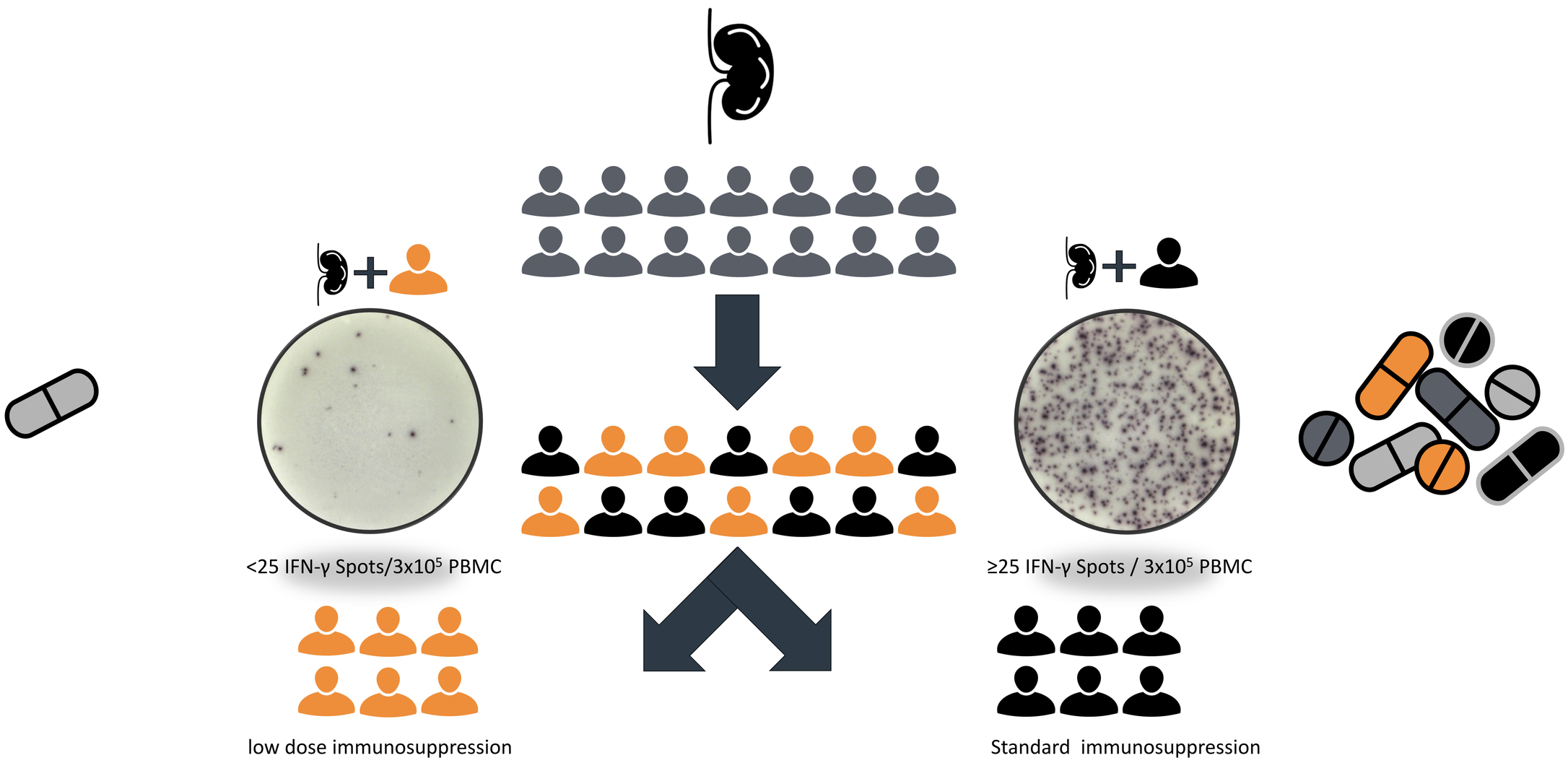

Fig.1: Stratification of patients into high / low responders for personalized immunosuppressive therapy. The multicenter, randomized Cellimin trail is designed to verify the usefulness of FN-γ for stratification of kidney transplant patients into high / low responder according to their frequency of donor-reactive memory / effector-T cells. Low responder patients defined to have <25 reactive spots / 300.000 PBMC will be identified by perioperative EliSpot and randomized 1:1 into two groups receiving either standard triple-drug regimen or minimized therapy (monotherapy) with the aim to demonstrate non-inferiority if minimization Is guided by biomarker. High-responder patients will get standard therapy as well.

Results

Interlab comparisons confirmed correct categorization of almost all patients into high/low-responder according to the predefined cut-off of t cells. To further demonstrate the extraordinarily high standardization, Inter- and Intra-Assay evaluation was performed. The CV% varied under 20 %, which is far below cellular assays specified by the FDA with 25 %. Virus-specific EliSpots enabled clear pictures of virus-related immune status of the transplant recipient beyond serological tests.

Conclusion

Monitoring specific t cell responses at different time points seem to add crucial information for predicting the risk of viral infection, thus helping iandividualization of therapeutic decisions in transplantation. Furthermore, the the EliSpot method is a high-performance tool for calssification and monitoring of immunosuppression. Based on the high standardization level this highly sensitive and reliable technology provides essential information for precision and personalized medicine.

Volk, H. D. et al. “Strategy to achieve biomarker-driven immunosuppression after solid organ transplantation by an academic-industry partnership within the European BIO-DrIM consortium.” *Advances in Precision Medicine* (2016): n. pag.

Bestard O, Meneghini M, Crespo E, et al. Preformed T cell alloimmunity and HLA eplet mismatch to guide immunosuppression minimization with tacrolimus monotherapy in kidney transplantation: Results of the CELLIMIN trial. Am J Transplant. 2021;21:2833–2845. h t t p s : //doi.org/10.1111/ajt.16563

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