Biobanking on demand – COVID-19-associated cohorts

P. ZARDOYA-LAGUARDIA[1], S. KRAL[1], V. PERZ[1], C. GÜLLY[1] and M. VALJAN[1]

1. **Biobank Graz**. *Organizational Unit for Research Infrastructure, Medical University of Graz, Graz, Austria*

INTRODUCTION

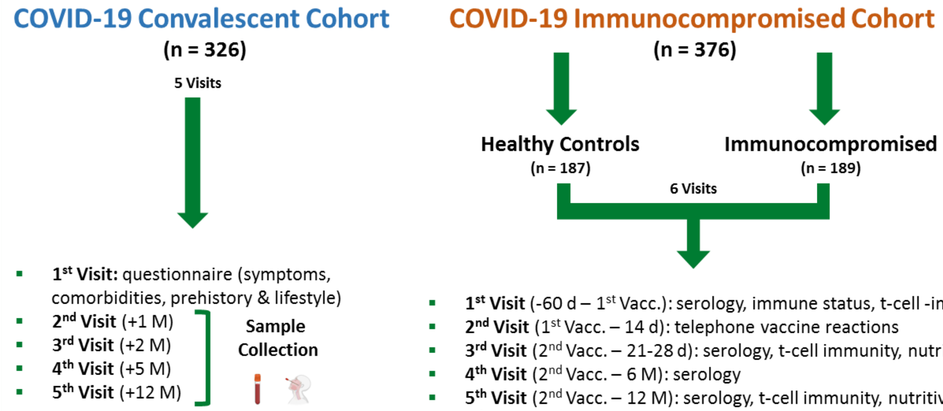
Biobank Graz is actively integrated in COVID-19 research by collecting, processing and storing relevant biospecimen for cooperative scientific research. A collection of samples from COVID-19 convalescents was set up, as well as a collection from vaccinated immunocompromised patients and healthy donors to study host immune response. The findings of these studies will be of major importance, as this pandemic is still a global challenge.

AIM

1. Development & validation of new antibody test/assays, characterization of SARS-CoV-2 antibody titer over time and identification of diagnostic biomarkers
2. Characterization of humoral and cellular response before and after vaccination of immunocompromised patients

METHODS

The 2 different cohorts were implemented as follows:



RESULTS

Table 1.
Results of the quantitative antibody assay (U/ml) in the whole cohort and in each subgroup.

	Baseline (Visit 1)		Visit 2		Visit 3		Visit 4	
	N	Median (Q1, Q3)	N	Median (Q1, Q3)	N	Median (Q1, Q3)	N	Median (Q1, Q3)
Whole cohort	320*	48.7 (14.9, 161.0)	241	68.8 (27.7, 189.0)	146	94.7 (37.6, 311.5)	90	131.5 (51.3, 421.5)
Participants with early baseline visit	84	11.4 (3.0, 35.8)	74	36.5 (12.8, 89.5)	35	37.3 (16.8, 95.8)	2	42.2 (41.0, 43.5)
Participants with late baseline visit	236	72.2 (27.5, 213.0)	167	89.2 (37.8, 300.0)	111	115.0 (49.9, 381.5)	88	132.5 (59.9, 437.0)
Participants with core symptoms	296	50.0 (16.5, 173.8)	223	70.5 (29.2, 209.5)	137	94.9 (38.4, 314.0)	86	144.0 (50.0, 467.0)
Participants without core symptoms	24	27.6 (2.1, 83.0)	18	45.8 (7.2, 83.9)	9	56.1 (28.4, 95.7)	4	76.5 (71.3, 90.5)
Participants without comorbidities	235	39.4 (12.2, 111.5)	176	50.4 (22.1, 146.8)	107	77.1 (32.4, 250.0)	61	117.0 (42.7, 415.0)
Participants with comorbidities	85	94.1 (42.6, 232.0)	65	122.0 (55.8, 319.0)	39	177.0 (80.3, 434.5)	29	221.0 (79.9, 579.0)

Note. Visits 2, 3, 4 occurred 1, 2, 5 months after the baseline (visit 1), respectively. * Five observations were censored due to vaccination already at baseline (visit 1). The value of the quantitative antibody assay of the first visit was missing for one participant.

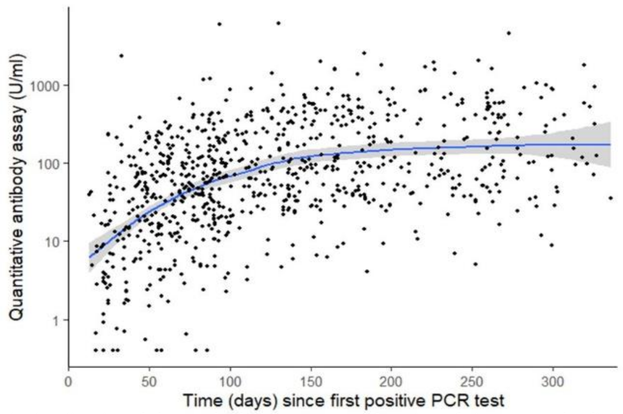


Fig.1.: Kinetics of the antibody response as a function of time since the first positive PCR test. Antibody levels are shown on a log10-scale on the y-axis. The blue line (with a gray band for the 95% confidence interval) is the output of Local Polynomial Regression Fitting (LOESS). Please not that to improve data visualization, one observation at day 360 was excluded from the plot

Table 1: Participants with late baseline visit had a significantly higher antibody level than participants with early baseline visit (estimate = 1.38, p<0.001). The presence of core symptoms (estimate = 0.52, p<0.001) and of comorbidities (estimate = 0.30, p<0.001) was related to higher antibody levels.

Fig. 1: Results revealed a significant positive association between log-transformed antibody quantitative titer and time since the first PCR test (estimate = 1.07, p<0.001)

CONCLUSION

This "demand-based" biobanking approach is a use-case how Biobanks – as trusted partner between study participants and the scientific community - and associated clinical departments join forces to efficiently set up highly standardized, well-characterized cohorts of potentially high scientific impact. To date, the results from the convalescent cohort showed an strong and persistent immune response against SARS-CoV-2 infection in individuals who recovered from a mild course of COVID-19 for up to 8 months post infection. Moreover, individuals without core symptoms developed immunity against SARS-CoV-2 although to a lower degree than individuals showing core symptoms, and it persisted through time.

REFERENCES

Kral S, Banfi C, Niedrist T, Sareban N, Guelly C, Kriegl L, et al. Long-lasting immune response to a mild course of PCR-confirmed SARS-CoV-2 infection: A cohort study. J Infect 2021 Aug 22.

pablo.zardoya-laguardia@medunigraz.at

Funded by