Title: The Swiss Rare Donor File – Facts and Future

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Background / Introduction:
Since January 2023, the Swiss Rare Donor File (RDF), the national registry of blood donors with absence for high-frequency antigens, has been managed by Blood Transfusion Service Zurich (BTSZ). The RDF enables rapid identification and allocation of compatible red blood cell (RBC) units for patients with public-antibodies. The registry is essential for ensuring adequate transfusion support within Switzerland and, if required, internationally.

Methods:
Rare blood donors in Switzerland are identified by efficient high-throughput genotyping and routine phenotyping methods. Twice a year, data on rare donors are provided by all 11 regional blood services (IRB, GE, BS, JU, SG, LU, AG, FR, GR, TI and ZH) and are coordinated by BTSZ. These data are accessible to all blood services and healthcare professionals. Inclusion generally requires at least one donation within the past five years. However, donors with very rare phenotypes (e.g., XK:-1 or hh) may be retained and contacted only when needed.

Results:
The Swiss RDF currently includes ~1,150 donors, with the most commonly identified antigen rarities being FY:-1,-2, KEL:-2, YT:-1, CO:-1 and LU:-2. Extremely rare phenotypes like DI:-2, hh, XK:-1, MNS:-3,-4,-5 are also represented. National requests for rare blood products were managed either by our immmunohematology team or directly by the respective services. International requests were forwarded through the International Rare Donor Panel or the ISBT Rare Donor Working Party. Over the past 3 years, we provided 42 RBC units to fulfil national—and, in rare instances, international—requests. International inquiries for GE:-2, JR:-1 and JK:-1,-2 could not be met. In the context of European collaboration, 4 cryopreserved units (--D-- and hh) and one packed unit (JR:-1) were imported for 3 pregnant women.

Conclusion:
The Swiss RDF provides essential support to supply rare blood products in Switzerland and abroad. To maintain and improve the database, time-consuming and costly donor genotyping and phenotyping of large numbers of blood donors will continue to be crucial in the future. In 2025 we were able to finalize the "extended RDF" project. Our aim is to expand the RDF to also cover very rare antigen combinations to meet the growing demand of transfusion dependent patients, such as those with hemoglobinopathies. To date, 132 donors with rare antigen combinations have been registered. Furthermore we aim to expand the antigen specificities to include additional relevant rare antigens, e.g. variants of the RHCE system, improving donor–patient matching. Additionally, a "Care for Rares" program has been initiated to enhance donor engagement and awareness. At the same time, patients with very rare specificities (e.g., JR:-1) should—provided their health status allows—be encouraged to register as future blood donors and first-degree relatives approached to undergo testing for this trait.