

Centrifuge Settings for T-LAB PRP Kits

Transferring validated protocols to custom or non-dedicated centrifuges

1. Match RCF, not RPM

RPM values are machine-specific because relative centrifugal force depends on the rotor radius. Two centrifuges spinning at the same RPM can deliver very different g-forces if their rotors differ in size. When transferring our protocols to a custom or non-standard centrifuge, always match the RCF (g) value — never the RPM. The RPM figures in our table are simply what the target RCF corresponds to on our reference rotors.

2. RCF targets for the T-LAB protocols

- Fixed-rotor configuration: **500 RCF** (2000 RPM) (3 min Pure PRP / 6 min Amber PRP)
- Swing-rotor configuration: **1150 RCF** (3000 RPM) (4 min Pure PRP / 8 min Amber PRP)

Keep the RCF and spin time as specified for your rotor type; only the RPM changes with your machine. The two rotor geometries use different validated RCF values because sedimentation dynamics differ between fixed-angle and swing-out rotors — do not apply the fixed-rotor RCF to a swing rotor, or vice versa.

3. Calculating RPM for your own centrifuge

- Identify your rotor type — fixed-angle vs. swing-out bucket.
- Measure r_{max} in cm: the distance from the center of the rotor spindle to the outermost point of the sample during the spin (bottom of the tube). For swing-out rotors, measure with the bucket in its horizontal spinning position.
- Apply the formula below. Many modern centrifuges accept RCF directly — if yours does, just enter 500 or 1150 and skip the calculation.

$$\text{RCF} = 1.118 \times 10^{-5} \times r \times \text{RPM}^2$$

$$\text{RPM} = 1000 \times \sqrt{\text{RCF} \div (11.18 \times r)}$$

4. RPM-to-RCF conversion table

RPM required to reach each target RCF, by rotor radius. The bold row corresponds to our standard centrifuges.

Rotor radius r_{max} (cm)	RPM for 500 RCF (fixed rotor)	RPM for 1150 RCF (swing rotor)
8	2364	3586
9	2229	3381
10	2115	3207
11	2016	3058
~11.2–11.4 (our reference)	2000	3000
12	1931	2928
13	1855	2813
14	1787	2711
15	1727	2619

Rotor radius r_max (cm)	RPM for 500 RCF (fixed rotor)	RPM for 1150 RCF (swing rotor)
16	1672	2536

5. Important — these settings assume a dedicated centrifuge

Our protocols are validated on our own centrifuges, which have controlled acceleration/deceleration profiles (soft braking) and temperature regulation. These features are part of why the settings work reliably. General-purpose centrifuges — especially those not designed for regenerative medicine — often lack them, and two real-world problems arise:

- **Calibration drift.** The RPM/RCF a centrifuge displays may not match what it actually delivers. An uncalibrated unit can run faster or slower than indicated, so the target g-force is not truly reached even when the numbers look correct on screen.
- **Hard braking.** Many non-dedicated centrifuges decelerate abruptly at the end of the run. This sudden stop disturbs the already-separated interface and causes the RBC layer to jet up into the plasma, contaminating it. Here the correct RCF can still give a poor result — the failure is in the deceleration, not the g-force.

On a non-dedicated centrifuge, do not assume our exact RCF will reproduce our result. Instead, find the closest setting that yields a clean, RBC-free plasma layer on that specific machine.

6. Optimization workflow for non-dedicated centrifuges

1. Draw a blood sample into a **sodium citrate tube** — the anticoagulant lets you re-mix and re-spin the same sample without clotting.
2. Run our recommended setting first (target RCF + specified time).
3. Inspect the result. If the plasma is clean and RBC-free, that setting works — you are done.
4. If RBCs have splashed into the plasma, **gently invert / homogenize the same tube** to re-suspend the sample, then re-spin.
5. Keep the RCF (g-force) exactly as we specify and increase **only the spin time**, in small increments, until you reach a clean, RBC-free separation. Do **not** raise the RPM/RCF to compensate: on a machine that brakes hard, a higher speed means a more violent stop and a worse RBC splash. Extending the time gives a more complete, tighter separation without adding energy to the deceleration.

A single blood draw is usually enough for the whole optimization — you do not need to re-draw for each trial. As long as the tube is anticoagulated (sodium citrate) and re-homogenized gently between attempts, the same sample can be re-spun several times to home in on the right setting.

Note — quick RPM/RCF conversion

You don't need to work through the formula by hand. Any free online RPM↔RCF calculator will do the conversion — just enter your rotor radius (r_max in cm) and the target RCF (500 or 1150), and it returns the RPM for your specific centrifuge. Alternatively, you can set this up once in a simple Excel sheet using the formula $RPM = 1000 \times \sqrt{RCF \div (11.18 \times r)}$, so any team member can read off the correct RPM for whatever centrifuge they're using.