When measuring skin blood perfusion with laser Doppler flowmetry, a non-penetrating optical probe is positioned so that the measured signal results from the motion of red blood cells within a 0.1 to 1 mm thick epidermal layer. Two lasers are used: a red 633 nm laser that is focused onto the skin surface and a near-infrared 940 nm laser. The former is used to provide tissue illumination. The latter is the source of the backscattered light detected by photodiode arrays. The Doppler shifts in the scattered light are analyzed to determine the blood perfusion rate.

### METHODS

**Subjects:** Thirty healthy participants aged 20-50 years were recruited for this study. All participants were informed about the experimental protocol and provided written consent.

**Protocol:** Tests were performed after a standard 20-hour fast. The participants were placed in a supine position, and their left arm was raised to a 90° angle. Laser Doppler flowmetry measurements were conducted before and after a 90-second period of standardized exercise. The exercise consisted of walking on a treadmill at a speed of 5 km/h and a gradient of 10%.

**Data Analysis:** Blood perfusion rates were calculated based on the changes in the laser Doppler signals. The data was analyzed using statistical software to determine the significance of the changes.

### RESULTS

**SBF Hyperemia:**
- Baseline SBF was 28 a.u.
- Post-exercise SBF increased to 117.3 a.u.
- The increase was statistically significant (p < 0.001).

**BZ Distribution:**
- BZ values were measured at baseline and after exercise.
- BZ remained constant after exercise.

### CONCLUSIONS

- Exercise induces SBF hyperemia, which is reflected in increased laser Doppler flowmetry signals.
- The baseline biological zero remains unaffected by exercise.

### REFERENCES


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**Figure 1:** SBF distribution before and after exercise.

**Figure 2:** BZ distribution at baseline and after exercise.