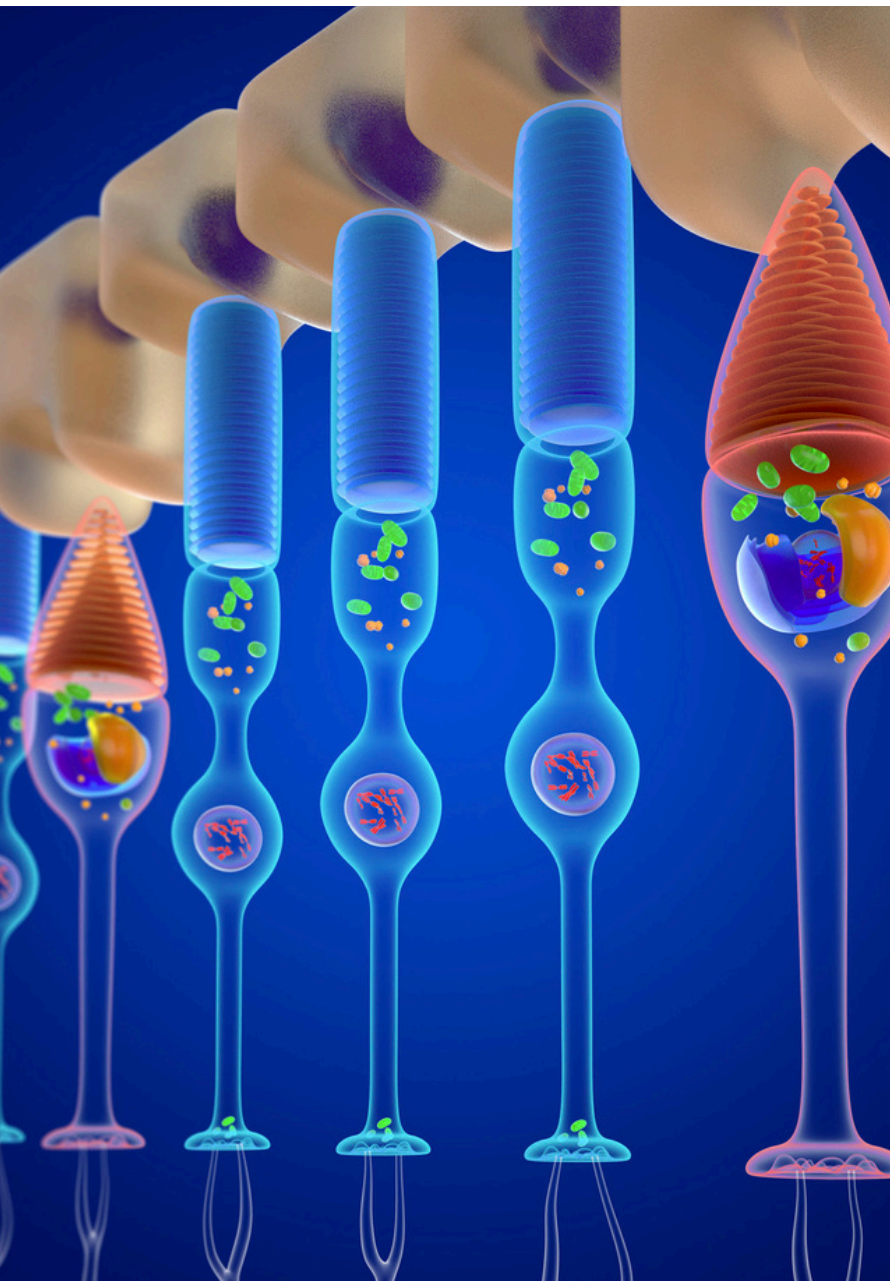
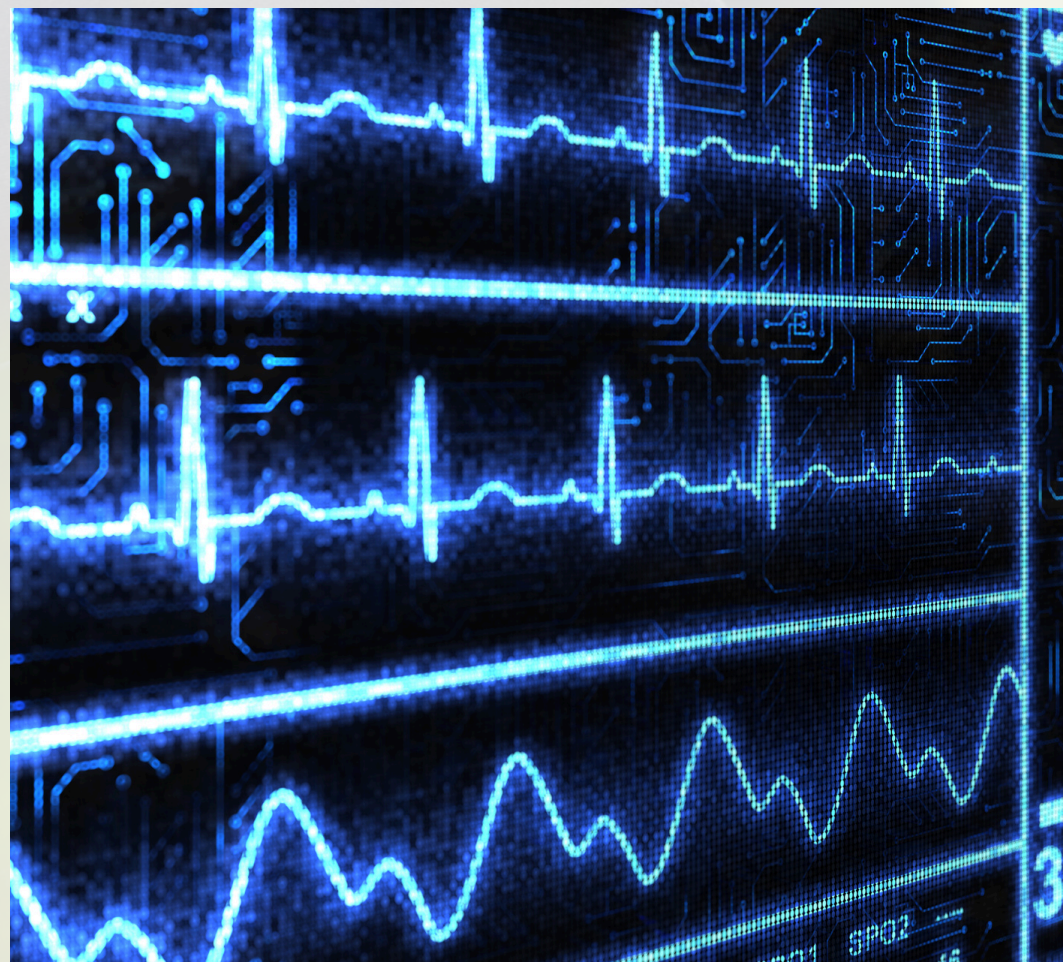


Retinal Microcirculation in Cardiac Rehabilitation



Background- Cardiovascular diseases (CVDs) remain a leading cause of mortality worldwide, with psychosocial stress significantly contributing to disease progression. Rehabilitation post-heart surgery is critical, typically involving exercise, lifestyle education, and stress reduction. Yoga and transcendental meditation (TM) have demonstrated potential benefits in enhancing cardiovascular health and reducing stress. This pilot study aimed to explore the effects of yoga and TM on retinal microcirculation, a novel approach to assessing cardiovascular health during cardiac rehabilitation.

Objective- To investigate the impact of three cardiac rehabilitation approaches—standard exercise therapy, standard therapy with TM, and standard therapy with yoga—on retinal microcirculation parameters in cardiac surgery patients.



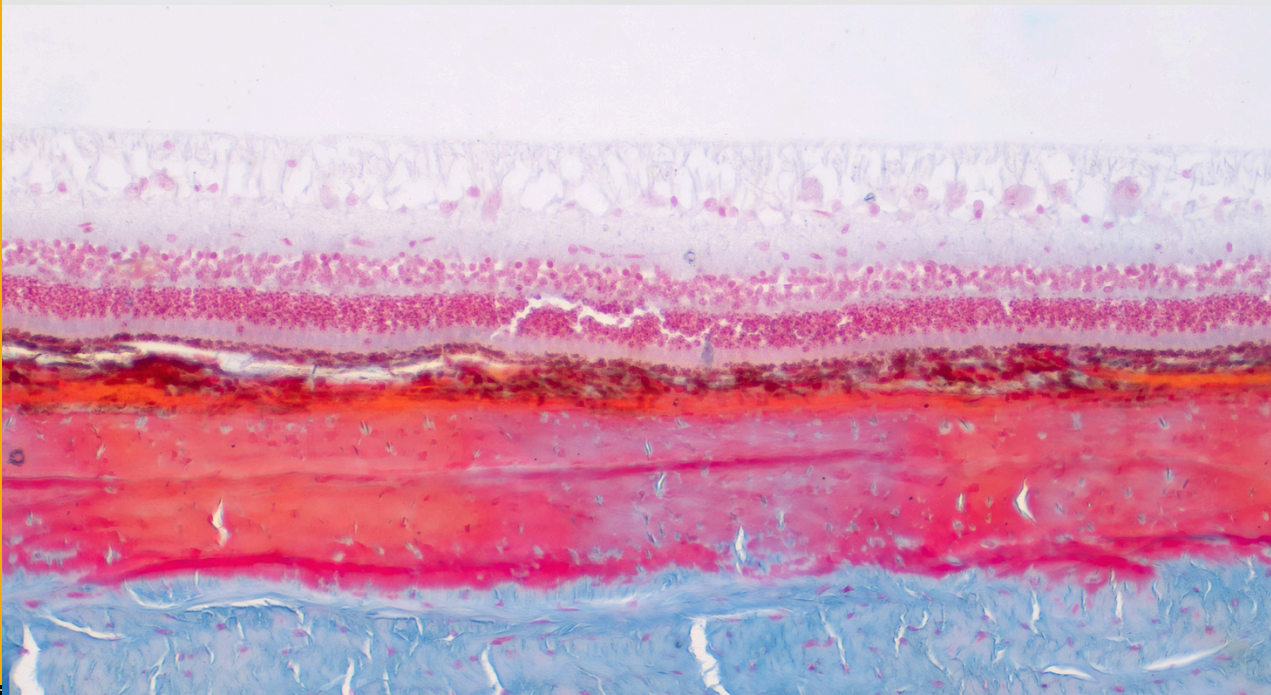


Mechanism—Yoga and TM are hypothesized to improve cardiovascular health by modulating autonomic activity—enhancing parasympathetic tone and reducing sympathetic overactivity. Retinal microcirculation, assessed via CRAE, CRVE, and AVR, serves as a non-invasive proxy for systemic cardiovascular health.

Methodology— A randomized, single-blinded clinical study was conducted with 30 participants undergoing a four-week cardiac rehabilitation program. Participants were assigned to three groups:

1. Control (standard exercise therapy).
2. TM group (20 minutes of meditation twice daily).
3. Yoga group (20 minutes of yoga exercises twice daily).

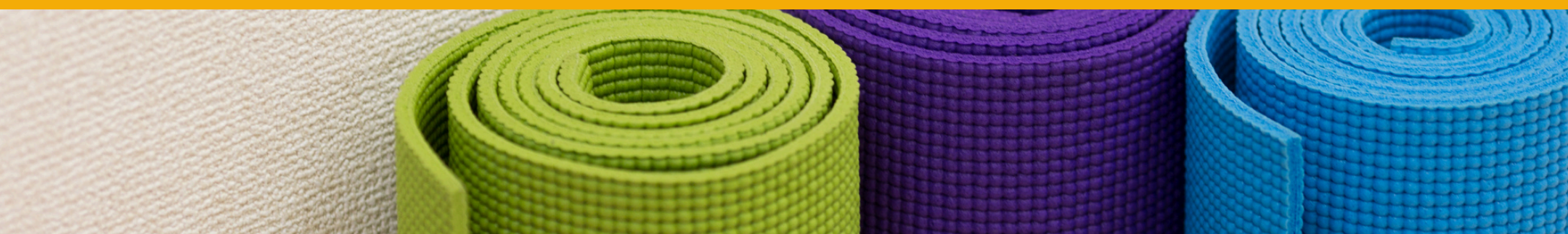
Retinal images were captured at admission, discharge, and three weeks post-discharge using a Canon CR-2 retinal camera. Parameters such as the central retinal artery equivalent (CRAE), central retinal vein equivalent (CRVE), and artery-to-vein ratio (AVR) were analyzed. Repeated measures ANOVA evaluated the differences across groups and time points.





Key Findings-

- No significant differences in retinal microcirculation parameters were observed between the three groups across all time points.
- The findings suggest that four weeks of intervention might be insufficient to elicit detectable changes in retinal microcirculation.



Implicationv for Future Research

The study underscores the need for extended-duration interventions and larger sample sizes to validate the benefits of yoga and TM in cardiac rehabilitation. Future research should also include assessments of psychological well-being and stress reduction, which might influence cardiovascular outcomes.