Supplementary Table S8: *Summary of Key Limitations in Current Evidence Linking Sleep and Ocular Health*

Limitation Category	Description	Implications for Research
1. Measurement Inconsistency	Diverse methodologies for assessing IOP, retinal function, sleep quality (e.g., CLS vs. tonometry; subjective sleep scales vs. polysomnography)	Reduces comparability across studies; introduces methodological heterogeneity
2. Lack of Longitudinal Data	Most studies are cross-sectional or retrospective in design	Limits ability to establish causal relationships between sleep disturbances and ocular disease progression
3. Sampling and Selection Bias	Over-representation of specific populations (e.g., clinic-based OSA cohorts, older adults, shift workers)	Affects generalizability of findings to broader populations
4. Animal-Human Translation Gap	Predominant use of nocturnal rodent models (e.g., mice, rats)	Circadian and metabolic rhythms differ significantly from diurnal humans, affecting translational validity
5. Confounding Variables Not Controlled	Factors such as light exposure, systemic inflammation, medications, comorbidities often not accounted for	Potential confounders may distort associations and reduce internal validity
6. Limited Interventional Evidence	Few randomized trials assessing whether improving sleep modifies ocular outcomes (e.g., CPAP for OSA-related glaucoma)	Hinders development of evidence-based therapeutic guidelines
7. Publication Bias and Grey Literature Gaps	Many systematic reviews fail to include non-indexed or negative-result studies	Risk of overestimating effect sizes; incomplete synthesis of available evidence