Statistical Analysis Plan

ProgSTAR Study

FFBCRI-PROGSTAR-01	The Natural History of the Progression of Atrophy Secondary to Stargardt Disease: A **Retrospective** Longitudinal Observational Study
FFBCRI-PROGSTAR-02	The Natural History of the Progression of Atrophy Secondary to Stargardt Disease: A **Prospective** Longitudinal Observational Study
FFBCRI-PROGSTAR-02a	**SMART** Study: Scotopic Microperimetric Assessment of Rod Function in Stargardt Disease
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Participant demographic and clinical characteristics at baseline (or the first ProgStar visit from the medical record review for the retrospective cohort) are first summarized. The progression rates of outcome measures from each testing modality (visual acuity from ETDRS test; mean sensitivity from microperimetry; decreased autofluorescence [AF] from fundus AF imaging; and retinal thickness and intact area from OCT) are estimated and reported separately. For each outcome, cross-sectional analysis using linear models with generalized estimating equations is first conducted for baseline data to understand factors associated with significantly different levels of baseline measurements. Longitudinal analysis is then conducted for each outcome to estimate its rate of progression and the associated risk factors. The data are longitudinally plotted over time to visualize the change during study period. A linear mixed-effects model (LMM) with a random intercept and a random coefficient for time is used to estimate the overall rate of change per year in the prospective and retrospective cohort, respectively. LMMs are also used to estimate the rates of change in subgroups stratified by the baseline level of the outcome. To further identify baseline variables associated with the rate of change, LMMs are used by including each baseline variable and its interaction with time. The univariate association of each variable with the change rate of the outcome variable is first estimated. Adjusted associations are also estimated using multivariable LMMs including variables either significantly associated with the change of outcome at $p<0.1$ or significantly associated with baseline outcome at $p<0.1$.

Additional statistical methods as appropriate for model construction are described in individual publications.