Biogenics Research Chamber functioned according to engineering specifications.

Air handlers maintained laminar flow and constant temperature and humidity control within target range.

The pollen delivery system dispersed pollen in a uniform manner.

No subjects responded during a blinded air-sham chamber run.

Two of 11-allergic subjects responded with low-level insignificant symptoms.

Non-priming runs were unsuccessful in triggering symptoms at adequate levels in a timely fashion in significant numbers of subjects. Priming chamber runs will be necessary to identify subjects for study with the chamber.

No serious adverse events occurred.

Utilizing Mt. Cedar pollen in the chamber provides a new model for studying allergic responses.

Methods: Operational without Subjects

- Preliminary chamber runs were done without subjects with maximal air flow output to determine if pollen is dispersed throughout the chambers.
- Symptoms that were scored included nasal congestion, sneezing, rhinorrhea, and itching. Ocular symptoms included redness, tearing, and itching.
- Audio and video systems are used for communication between the chambers and the control room.
- An electrostatic energy source is employed to neutralize pollen at chamber entrance to prevent pollen build-up in the chambers.

Methods: Mechanical

- The pollen dispersal system was activated without pollen for an Air-only priming run. Air flow rates are measured just prior to entering the chamber. Feeder rates are adjusted to deliver the desired pollen concentration.
- The pollen dispersal system is activated for a preliminary run to determine the appropriate concentration of pollen needed for full response at maximal outside temperatures.
- Two separate runs are done to deliver pollen at single or dual phase for i.e., the system and distributed from ducts by filtered, powered exhausts from the ceiling and exhausted by filtered, powered exhausts at the floor level. Air exchange rates are 12 full cycles/hr.
- Subjects were exposed to computer-controlled chamber with two separate runs for the diffuser (t-test, p = 0.36) or the powered exhaust (t-test, p = 0.06).

Figure 4. Mean Total Symptom Scores Over Time of Combined Mildly to Moderately and Highly Sensitive Subjects in a Non-Primed Chamber Run

After priming runs, there were significant reductions in the mean Total Symptom Score (TSS) measured by the chamber. There was a trend (p < 0.05) for the two sensitivity groups with symbols representing the mean and solid vertical lines representing the standard deviation (SD). A repeated-measures ANOVA was performed to assess the effects of baseline, run, and interaction on the TSS. A repeated-measures ANOVA, followed by post-hoc Bonferroni corrected pairwise comparisons, was used to determine the significant group by time interaction (p = 0.03). Results indicated that there were significant group by time interaction (p = 0.03) between the groups and the total number of runs increased. For the relatively high number of runs, the results were significant (p < 0.01).

CONCLUSIONS

- Biogenics Research Chamber functioned according to engineering specifications.
- Air handlers maintained laminar flow and constant temperature and humidity control within target range.
- The pollen delivery system dispersed pollen in a uniform manner.
- No subjects responded during a blinded air-sham chamber run.
- Two of 11-allergic subjects responded with low-level insignificant symptoms.
- Non-priming runs were unsuccessful in triggering symptoms at adequate levels in a timely fashion in significant numbers of subjects. Priming chamber runs will be necessary to identify subjects for study with the chamber.
- No serious adverse events occurred.
- Utilizing Mt. Cedar pollen in the chamber provides a new model for studying allergic responses.