Machine learning approaches provided superior predictions (accuracy ≥ 73%) for predicting skin sensitization. The human cell line activation test (hCLAT) and quantitative structure-activity relationships (QSAR) models were used to predict skin sensitization. The most important variables were average lysine and cysteine levels. The performance statistics for the ability of the machine learning methods to predict LLNA outcomes are shown in Table 1. The direct peptide reactivity assay (DPRA) was also used to predict skin sensitization. The key biological events leading to skin sensitization are shown in Figure 1. The study design and model building are shown in Figure 2. The conclusions of the study are shown in Table 2.