Motivated by the study of gene and environment interactions, we consider a multivariate response varying-coefficient model with a large number of covariates. The need of nonparametrically estimating a large number of coefficient functions given relatively limited data poses a big challenge for fitting such a model. To overcome the challenge, we develop a method that reduce the number of unknown functions to be estimated by using principal components and apply sparsity-inducing penalization to select relevant covariates. Our asymptotic theory shows that the proposed method can consistently identify relevant covariates and can estimate the corresponding coefficient functions with the same convergence rate as when only the relevant variables are included in the model. Our method is illustrated using data from Framingham Heart Study.