The Invariance Theorem of M. Gerstenhaber and S. D. Schack states that if $A$ is a diagram of algebras then the subdivision functor induces a natural isomorphism between the Yoneda cohomologies of the category $A\text{-mod}$ and its subdivided category $A'\text{-mod}$. In this paper we generalize this result and show that the subdivision functor is a full and faithful functor between two suitable derived categories of $A\text{-mod}$ and $A'\text{-mod}$. This result combined with our work on the Special Cohomology Comparison Theorem, constitutes a generalization of M. Gerstenhaber and S. D. Schack’s General Cohomology Comparison Theorem. (Received September 21, 2010)