

Abstract

The present invention provides a multifunctional multispecific multimeric biomolecule polymer which is formed by obtaining a biomolecule, to which a ubiquitin C-terminal tag is bound, by recombinantly expressing the biomolecule from a host cell, and polyubiquitinating, in vitro, the biomolecule along with a substrate, and proteins E1 (activation enzyme), E2 (conjugation enzyme) and E3 (ligase) which are involved in ubiquitination, and thus having the biomolecule bind to a polyubiquitin scaffold which is formed by covalently bonding two or more ubiquitins. The biomolecule of the present invention may be one or more selected from the group consisting of a protein, peptide, polypeptide, antibody, antibody fragment, DNA and RNA, and, for example, by using heterologous proteins, modularized functionality may be imparted to the multifunctional multispecific biomolecule polymer. In addition, according to the present invention, the multifunctional multispecific multimeric biomolecule polymer is provided in a form that is bound to a molecule capable of increasing the in vivo duration, and thus may be used for producing drugs requiring the increased in vivo duration of efficacy.