WHAT IS CLAIMED IS:

1. Use of a water-soluble compound comprising a polymer and at least one terminal azide moiety for the selective modification of proteins, wherein said polymer is selected from the group consisting of poly(alkylene oxides), poly(oxyethylated polyols), and poly(olefinic alcohols), and wherein in use, said protein is selectively modified with said water-soluble compound.

2. The use of claim 1, wherein said polymer is selected from the group consisting of poly(ethylene glycol), poly(propylene glycol), poly(oxyethylated glycerol), poly(oxyethylated sorbitol), poly(oxyethylated glucose), and poly(vinyl alcohol).

3. The use of claim 1, wherein said polymer comprises poly(ethylene glycol).

4. The use of claim 3, wherein said compound comprises poly(ethylene glycol)azide and the azide moiety is covalently attached directly to a polymer backbone; or wherein said compound comprises poly(ethylene glycol)azide and the azide moiety is covalently attached to a polymer backbone via a linker.

5. The use of claim 1, wherein said polymer comprises a straight chain polymer and the compound is not substituted beyond the azide moiety.

6. The use of claim 1, wherein said polymer is a random or block copolymer or terpolymer.

7. The use of claim 1, wherein said compound comprises a dumbbell structure comprising: a) said azide moiety on at least a first end of a polymer backbone; and b) at least a second functional group on a second end of the polymer backbone; wherein the second functional group can be the same or different from said azide moiety; preferably wherein said second functional group is not reactive with azide moieties.

8. The use of claim 1, wherein said compound comprises at least one arm of a branched molecular structure; preferably wherein said branched molecular structure is dendritic.

9. The use of claim 1, wherein said azide moiety forms a linkage with a reactive moiety on a surface or in a molecule; preferably wherein said reactive moiety is an acetylene moiety.

10. The use of claim 1, wherein said azide moiety is linked to said polymer by a linkage that comprises a linker moiety and wherein said polymer comprises at least a second functional group other than said azide moiety for linking to said linker moiety.

11. The use of claim 10, wherein said second functional group is specific for nucleophilic displacement and said linker moiety includes a nucleophilic moiety capable of reacting with said functional group; or

wherein said second functional group is amine-specific and said linker moiety includes an active amine moiety;

wherein said second functional group is specific for reaction at an electrophilic carbonyl and said linker moiety includes an electrophilic carbonyl moiety; or

wherein said second functional group is specific for reaction with an activated ester and said linker moiety includes an activated ester; or

wherein said second functional group is specific for reaction with a ketone and said linker moiety includes an ketone; or

wherein said second functional group is specific for reaction with a thiol nucleophile and said linker moiety includes a thiol nucleophile; or

wherein said second functional group is specific for reaction with a hydroxyl nucleophile and said linker moiety includes a hydroxyl nucleophile; or

wherein said linker moiety is selected from the group consisting of:

--NH--CO--CH_2--CH_2--;

--CO--NH--CH_2--CH_2--;

--S--CH_2--CH_2--; and

--O--CH_2--CH_2--.

12. The use of claim 1, wherein said compound is stable in aqueous environments at a pH of about 11 or less.

13. Use of a water soluble activated polymer that is stable against hydrolysis for the selective modification of proteins, said activated polymer having the formula:

R--CH_2CH_2--$(OCH_2\ CH_2)_n$--N_3; wherein

n is from about 5 to 3,000, and R is a capping group, a functional group, or a leaving group that can be the same or different from the azide; and wherein in use, said protein is selectively modified with said water-soluble activated polymer.

14. The use of claim 13 wherein R is a functional group selected from the group consisting of hydroxyl, protected hydroxyl, alkoxyl, N-hydroxysuccinimidyl ester, 1-benzotriazolyl ester, N-hydroxysuccinimidyl carbonate, 1-benzotriazolyl carbonate, acetal, aldehyde, aldehyde hydrates, alkenyl, acrylate, methacrylate, acrylamide, active sulfone, amine, aminooxy, protected amine, hydrazide, protected hydrazide, protected thiol, carboxylic acid, protected carboxylic acid, isocyanate, isothiocyanate, maleimide, vinylsulfone, dithiopyridine, vinylpyridine, iodoacetamide, epoxide, glyoxals, diones, mesylates, tosylates, and tresylate, alkene, and ketone.

15. The use of claim 13 wherein n is from 5 to 2,200; or wherein n is from 34 to 1,100, or wherein n is from 45 to 110; or wherein R is methoxy (CH_3O--), carboxylic acid (HO_2C--), amine (H_2N--), or maleimide; or wherein R is reactive with amines, electrophikic carbonyl groups, thiols, or hydroxyls .