Patent Claims

1. A complex comprising

   a) a first polypeptide that specifically binds to a first target and that is conjugated to a first member of a first binding pair,

   b) a second polypeptide that specifically binds to a second target and that is conjugated to a first member of a second binding pair, and

   c) a ss-L-DNA-linker conjugated to the second member of the first binding pair and conjugated to the second member of the second binding pair.

2. A complex comprising

   a) a polypeptide that specifically binds to a target and that is conjugated to a first member of a binding pair,

   b) a ss-L-DNA-linker conjugated to the second member of the binding pair, and

   c) an effector moiety conjugated to a polynucleotide that is complementary to at least a part of the ss-L-DNA-linker.

3. The complex according to any one of the preceding claims, characterized in further comprising an effector moiety conjugated to a polynucleotide that is complementary to at least a part of the ss-L-DNA-linker.

4. The complex according to claim 1, characterized in further comprising an effector moiety conjugated to a polynucleotide (L-DNA) that is complementary to at least a part of the ss-L-DNA-linker.

5. The complex according to any one of the preceding claims, characterized in that the polypeptide is a monovalent antibody or monovalent antibody fragment.

6. The complex according to claim ~~5~~1, characterized in that the first and second polypeptide bind to the same target and to non-overlapping epitopes on the same target.

7. The complex according to any one of the preceding claims, characterized in that the first and second members ~~of the binding pairs~~ are selected from the group consisting of leucine zipper domain dimers and hybridizing nucleic acid sequences.

8. The complex according to any one of the preceding claims, characterized in that the complex is a non-covalent complex.

9. The complex according to any one of the preceding claims, characterized in that the effector moiety is selected from the group consisting of a binding moiety, a labeling moiety and a biologically active moiety.

10. The complex according to any one of the preceding claims, characterized in that the first polypeptide is the FAB' fragment of the anti-HER2 antibody 2C4, the second polypeptide is the FAB' fragment of the anti-HER2 antibody 4D5, the members of the binding pair are hybridizing nucleic acids and the ss-L-DNA-linker comprises 60 to 100 L-DNA nucleotides.

11. The complex according to any one of the preceding claims, characterized in that the first and second member of the first binding pair comprise the nucleic acid sequences of SEQ ID NO: 05 and SEQ ID NO: 08.

12. The complex according to any one of the preceding claims, characterized in that the first and second member of the second binding pair comprise the nucleic acid sequences of SEQ ID NO: 06 and SEQ ID NO: 07.

13. A method of producing a complex comprising the components

a) a polypeptide that specifically binds to a target and that is conjugated to a first member of a binding pair,

b) a ~~polynucleotide-~~ss-L-DNA-linker conjugated to the second member of the binding pair, and

c) an effector moiety conjugated to a polynucleotide that is complementary to at least a part of the polynucleotide linker,

comprising the steps of: a) synthesizing the polypeptide specifically binding to a target and conjugated to a first member of a binding pair, and synthesizing an effector moiety conjugated to a polynucleotide that is complementary to at least a part of the ~~polynucleotide-~~ss-L-DNA-linker, respectively, b) synthesizing the ~~polynucleotide-~~ss-L-DNA-linker conjugated at its first terminus to the second member of the binding pair, and c) forming the polypeptide-polynucleotide-complex by hybridizing the synthesized components.

14. A method of producing a complex comprising the components

a) a first polypeptide that specifically binds to a first target and that is conjugated to a first member of a first binding pair,

b) a second polypeptide that specifically binds to a second target and that is conjugated to a first member of a second binding pair, and

c) a ~~polynucleotide-~~ss-L-DNA-linker conjugated to the second member of the first binding pair and conjugated to the second member of the second binding pair,

comprising the steps of: a) synthesizing the first polypeptide specifically binding to a first target which is conjugated to a first member of a first binding pair, and synthesizing the second polypeptide specifically binding to a second target which is conjugated to a first member of a second binding pair, respectively, and b) synthesizing the ~~polynucleotide-~~ss-L-DNA-linker conjugated at its first terminus to the second member of the first binding pair and conjugated at its second terminus to the second member of the second binding pair, and c) forming the polypeptide-polynucleotide-complex by hybridizing the synthesized components.

15. A pharmaceutical formulation comprising the complex according to any one of the claims 1 to 12 and optionally a pharmaceutically acceptable carrier.

16. The complex according to any one of claims 1 to 12 for use as a medicament.

17. Use of the complex according to any one of claims 1 to 12 in the manufacture of a medicament.