CLAIMS

1. A fusion protein comprising:

a carbohydrate recognition domain (CRD) comprising an amino acid sequence having greater than 90% homology to SEQ ID NO: 5, which comprises a mannose-binding lectin (MBL) CRD and neck domain, and

which excludes complement and coagulation activation regions of MBL,

in which the fusion protein does not activate complement.

2. A fusion protein comprising:

a CRD comprising an amino acid sequence having greater than 90% homology to SEQ ID NO: 5, which comprises an MBL CRD and neck domain, and

not comprising a N-terminal cysteine rich region or collagen-like region of MBL.

3. A fusion protein according to Claim 1 or 2, which further comprises:

a substrate-binding domain adapted for orienting the carbohydrate recognition domain away from a substrate, and

at least one linker between the CRD and the substrate-binding domain.

4. A fusion protein according to Claim 1, 2 or 3, in which the substrate is selected from the group consisting of a nucleic acid scaffold; a protein scaffold; a lipid scaffold; a dendrimer; microparticle or a microbead; a nanotube; a microtiter plate; a medical apparatus or implant; a microchip; a filtration device; a membrane; a diagnostic strip; a dipstick; an extracorporeal device; a spiral mixer; and a hollow-fiber reactor.

5. A fusion protein according to any preceding claim, in which the substrate is a magnetic microparticle.

6. A fusion protein according to any preceding claim, in which the linker comprises an Fc portion of an immunoglobulin.

7. A fusion protein according to Claim 6, in which the Fc portion is N-terminal to the amino acid sequence having greater than 90% homology to SEQ ID NO: 5.

8. A fusion protein according to any preceding claim, which further comprises a detectable label.

9. A fusion protein according to Claim 8, in which the detectable label is selected from the group consisting of biotin; a fluorescent dye or particle; a luminescent or bioluminescent marker; a radiolabel; an enzyme; a microbial enzyme substrate; a quantum dot; an imaging agent; and any combinations thereof.

10. A hollow-fiber reactor coated with a fusion protein that comprises:

a CRD comprising an amino acid sequence having greater than 90% homology to SEQ ID NO: 4, which comprises an MBL CRD, and

excludes complement and coagulation activation regions of MBL.

11. A hollow-fiber reactor according to Claim 10, in which the fusion protein further comprises an Fc portion of an immunoglobulin.

12. A hollow-fiber reactor according to Claim 11, in which the Fc portion is N-terminal to the amino acid sequence having at least 90% homology to SEQ ID NO: 4 of the fusion protein.

13. A hollow-fiber reactor according to Claim 10, 11 or 12, in which the fusion protein forms multimers of at least dimers of the fusion proteins.

14. A hollow-fiber reactor according to any of Claims 10 to 13, in which the fusion protein forms multimers of at least pentamers of the fusion proteins.

15. A method for removing a microbe and/or microbial matter from a sample, comprising:

(a) contacting the sample with a fusion protein according to any of Claims 1 to 9; and

(b) removing the microbe or microbial matter from the sample.

16. A method for removing a microbe and/or microbial matter from a sample, comprising:

(a) contacting the sample with a hollow-fiber reactor according to any of Claims 10 to 14; and

(b) removing the microbe or microbial matter from the sample.

17. An assay for determining the presence or absence of a microbe and/or microbial matter in a test sample, the assay comprising:

(a) contacting the test sample with a fusion protein according to any of Claims 1 to 9; and

(b) detecting binding of microbe or microbial matter to at least a portion of the fusion proteins.