

Claims

1. A protein crystal comprising:
 - (a) a first protein crystal having available space in the lattice, the first protein being a p21-activated kinase 4, PAK 4, or a catalytic domain thereof; and
 - (b) a second protein crystal to be accommodated in the available space in the lattice, the second protein being an iBox of Inka1, the first and second proteins are co-expressed from one or more nucleic acid construct,wherein the crystal further accommodates a moiety in the available space in the lattice.
2. The protein crystal according to claim 1, wherein the moiety is a protein of interest.
3. The protein crystal according to claim 2, wherein the moiety is fused to iBox or iBox-C of Inka1, and has a molecular mass less than 30 kDa.
4. The protein crystal according to any one of the preceding claims, wherein the moiety further comprises a reporter molecule, and the reporter molecule is any one selected from the group comprising: fluorescent proteins, tags recognized by monoclonal antibodies, and genetically encoded biosensors.
5. The protein crystal according to any one of the preceding claims, wherein the ratio of the first protein to the second protein is 1:1 and the protein crystal forms a hexagonal array with channels of 80 Å in diameter.
6. The protein crystal according to any one of the preceding claims, wherein the protein crystal is formed *in cellulo* in a mammalian cell.
7. The protein crystal according to any one of the preceding claims, wherein the crystal is more than 50µm in length and the crystal structure is determined at less than 3 Å resolution.

8. A fusion protein, wherein the fusion protein comprising:
- (a) a first protein, upon crystallisation, yields a crystal having available space in the lattice, the first protein being a p21-activated kinase 4, PAK4, or a catalytic domain thereof; and
 - (b) a second protein crystal to be accommodated, upon crystallisation, in the available space in the lattice, the second protein being an iBox of Inka1, the first and second proteins are co-expressed from one or more nucleic acid construct,
- wherein the lattice is capable of accommodating a moiety in the available space.
9. The fusion protein according to claim 8, wherein the moiety is a protein of interest.
10. One or more isolated polypeptide molecule or nucleic acid molecule having a sequence or sequences that encode a protein or proteins which, upon crystallisation, form a protein crystal according to any one of claims 1 to 7.
11. A host cell comprising one or more isolated polypeptide molecule or nucleic acid molecule according to claim 10 or an expression vector harbouring one or more isolated nucleic acid molecule according to claim 10.
12. A method for producing a protein crystal structure or a fusion protein comprising a first protein, upon crystallisation, yields a crystal having available space in the lattice, the first protein being a p21-activated kinase 4, PAK4, or a catalytic domain thereof; and a second protein is accommodated, upon crystallisation, in the available space in the lattice, the second protein being an iBox of Inka1, and the method comprising culturing a host cell under conditions that allow for the production of the protein crystal or fusion protein, wherein the first and second protein are co-expressed from one or more nucleic acid construct, and the crystal further accommodates a moiety in the available space in the lattice.

13. The method according to claim 12, wherein co-expression and/or conditions for crystallisation is/are carried out *in vitro*.
14. The method according to claim 12, wherein the moiety is a protein of interest.
15. The method according to any one of claims 12 to 14, further comprising fusing the moiety with the second protein or fusing the moiety with a reporter molecule, wherein the moiety is a protein of interest having a molecular mass less than 30 kDa.