

CLAIMS

1. A method of detecting an RNA and a protein in a sample, the method comprising:

(a) incubating a sample in a reaction mixture with a pair of protein-detecting proximity probes comprising a first and a second protein detecting proximity probe where:

the first protein-detecting probe comprises a first antibody that binds to the target protein joined to a first polynucleotide that comprises an I segment at the 3' end that is complementary to an I segment on the 3' end of the second probe; and

the second protein-detecting probe comprises a second antibody that binds to the target protein joined to a second polynucleotide that comprises an I segment complementary to the I segment at the 3' end of the first polynucleotide;

wherein binding of the first antibody to the target protein and binding of the second antibody to the target protein allows the I segment of the first protein proximity probe to hybridize to the I segment of the second protein proximity probe to form a duplex;

(b) extending the duplex using a DNA polymerase to provide an extended product

(c) amplifying the extended product, or a subregion thereof, using a set of primers that amplify the extended product or subregion thereof; and

(d) detecting an RNA of interest in the sample and the amount of amplicon from amplification of the extended product or subregion thereof.

2. The method of claim 1, wherein the sample is a single cell.

3. The method of claim 1, wherein the detecting step comprises a quantitative amplification reaction.

4. The method of claim 3, wherein the quantitative amplification reaction is qPCR.
5. The method of claim 1, wherein the DNA polymerase has 3' exonuclease activity.
6. The method of claim 1, wherein the amplification of step (c) is performed with a DNA polymerase different from the DNA polymerase employed in the extension reaction of step (b).
7. The method of claim 6, wherein the DNA polymerase in amplification reaction is a thermostable polymerase.
8. The method of claim 1, wherein the detecting step comprises a quantitative amplification reaction.
9. The method of claim 8, wherein the quantitative amplification reaction is qPCR.
10. The method of claim 1, wherein the detecting step comprises quantifying the amount of amplicon.
11. The method of claim 1, wherein detecting the RNA of interest in the sample comprises detecting an amplicon obtained by amplifying an extended product of a nucleic acid proximity extension reaction.