CLAIMS:

1. A method of *in situ* hybridization chain reaction, comprising:

providing:

a first fractional initiator probe comprising a first fractional initiator;

a second fractional initiator probe comprising a second fractional initiator;

a first hairpin monomer, comprising:

a first input domain, comprising a first toehold and a first stem section,

a first output domain, comprising a first hairpin loop and a complement to the first stem section, and

a first hapten molecule;

a second hairpin monomer, comprising:

a second input domain, comprising a second toehold and a second stem section,

a second output domain, comprising a second hairpin loop and a complement to the second stem section, and

a second hapten molecule;

a target;

incubating the first fractional initiator probe and the second fractional initiator probe with the target *in situ*;

wherein the incubating binds the first fractional initiator probe to the target and binds the second fractional initiator probe to the target;

wherein the incubating further comprises binding the first hairpin monomer to the first fractional initiator and the second fractional initiator, such that the first hairpin monomer is opened; and

binding the second hairpin monomer to the first hairpin monomer, such that the second hairpin monomer is opened and the first and second hairpin monomers polymerize to yield an HCR amplification polymer tethered to the target and comprising one or more haptens.

2. The method of claim 1, further comprising:

providing an anti-hapten molecule labeled with one or more reporter entities, wherein the reporter entity is an enzyme that mediates CARD;

providing one or more CARD-substrates;

measuring a signal from one or more deposited reporters generated from the CARD-substrate by the enzyme that mediates CARD.

3. The method of claim 2, wherein the anti-hapten molecule is an anti-hapten antibody or an anti-hapten nanobody.

4. The method of any one of claims 1-3, wherein the at least one target is a nucleic acid or a protein.

5. The method of any one of claims 1-4, wherein the at least one target is an RNA.

6. The method of claim 1, wherein the probes are secondary probes and wherein the target is a secondary target, and wherein the secondary target is a primary probe that binds a primary target; wherein the primary probe is a primary antibody and the primary target is a protein.

7. The method of claim 6, wherein the primary probe is a primary antibody or a nanobody.

8. The method of claim 3, wherein the anti-hapten antibody is a primary antibody.

9. The method of claim 3, wherein the anti-hapten antibody comprises a primary antibody that binds the hapten and the method further comprises a secondary antibody labeled with one or more reporter entities that binds the primary antibody.

10. The method of claim 2, wherein the one or more deposited reporters comprise one or more auxiliary reporters generated from an auxiliary CARD-substrate labeled with an auxiliary hapten that mediates localization of auxiliary reporters in the vicinity of the target, and wherein signal is measured from one or more auxiliary reporters.

11. The method of claim 10, wherein the auxiliary CARD-substrate is a tyramide.

12. The method of claim 2, wherein the one or more deposited reporters is a fluorophore-labeled tyramide.