CLAIMS

1. A method of characterizing a first agent, comprising

   i) contacting the first agent with a composition comprising a condensate, wherein the condensate comprises a second agent before contacting with the first agent, and

   ii) measuring the ability of the first agent to cause eviction of the second agent from the condensate;

   wherein the eviction of the second agent from the condensate characterizes the first agent as having one or more of following properties:

   a) the first agent has higher affinity for a component of the condensate than the second agent,

   b) the first agent can release the second agent from the condensate, wherein the second agent does not have a target component in the condensate,

   c) the first agent has similar or higher condensate partition property than the second agent, or

   d) the first agent and the second agent have similar structure;

   wherein the first agent and the second agent are both small molecules.

2. The method of claim 1, wherein the first agent and/or the second agent comprises a detectable tag.

3. The method of claim 2, wherein the detectable tag is a fluorescent tag.

4. The method of claim 2 or 3, wherein the detectable tag does not affect the condensate partition property of the first agent and/or the second agent.

5. The method of any one of claims 1-4, wherein the condensate comprises a target component for the second agent.

6. The method of any one of claims 1-4, wherein the condensate does not comprises a target component for the second agent.

7. The method of any one of claims 1-6, wherein the first agent is an isomer of the second agent.

8. The method of any one of claims 1-7, wherein the composition comprising the condensate is a cellular composition comprising the condensate within a cell.

9. The method of any one of claims 1-7, wherein the composition comprising the condensate does not comprise a cell.

10. The method of any one of claims 1-9, wherein

    i) the ability of the first agent to cause eviction of the second agent from the condensate is measured by the amount of the second agent remaining in the condensate after contacting the composition with the first agent;

    ii) the ability of the first agent to cause eviction of the second agent from the condensate is measured by the amount of the second agent outside of the condensate after contacting the composition with the first agent; or

    iii) the ability of the first agent to cause eviction of the second agent from the condensate is measured by the ratio of the second agent inside and outside of the condensate after contacting the composition with the first agent.

11. The method of any one of claims 1-10, wherein measuring the ability of the first agent to cause eviction of the second agent from the condensate comprises use of a technique selected from one or more of Raman spectroscopy, spectrophotometry, mass spectrometry, nuclear magnetic resonance, chromatography, quantitative phase microscopy, fluorescent microscopy, and a spin down assay.

12. The method of any one of claims 1-11, wherein the composition is contacted with an increasing amount of the first agent, and the eviction of the second agent from the condensate is measured continuously or at discrete intervals.

13. Use of an agent in the manufacture of a medicament for reducing transcription of an oncogene, wherein the medicament comprising the agent is to be administered to contact a transcription condensate associated with the oncogene, wherein the contacting modulates the composition of, dissolves, or disassociates the transcriptional condensate, thereby reducing transcription of the oncogene.

14. The use of claim 13,

    i) wherein the agent evicts one or more components of the transcriptional condensate;
    ii) wherein the agent binds to a component of the transcriptional condensate; and/or
    iii) wherein the agent preferentially concentrates in the transcriptional condensate.

15. The use of claim 13 or 14, wherein the transcriptional condensate is located in a cancer cell of a subject having cancer.

16. Use of a peptide in the manufacture of a medicament for inhibiting transcription associated with a transcriptional condensate, wherein the medicament comprising the peptide is to be administered to contact the transcriptional condensate, wherein the contacting inhibits the binding of a nuclear receptor having an LXXLL binding domain and associated with the transcriptional condensate to a cofactor having an LXXLL domain, and wherein the peptide binds to the LXXLL binding domain of the nuclear receptor, or the LXXLL domain of the cofactor.

17. The use of claim 16, wherein the nuclear receptor is a nuclear hormone receptor, an Estrogen Receptor, or a Retinoic Acid Receptor-Alpha.

18. The use of claim 16 or 17, wherein the cofactor is MED1.

19. The use of any one of claims 16-18, wherein the transcription of an oncogene associated with the transcriptional condensate is inhibited.

20. The use of any one of claims 16-19, wherein the transcriptional condensate is located in a cancer cell of a subject having cancer.

21. A composition comprising a cell, wherein the cell comprises a first condensate comprising a first detectable label, and a second condensate comprising a second detectable label, wherein the first condensate and the second condensate are different condensate types selected from the group consisting of a transcriptional condensate, a super-enhancer condensate, a splicing speckle condensate, a heterochromatin condensate, and nucleolus, and wherein the first detectable label and the second detectable label are different.

22. The composition of claim 21, wherein the composition further comprises an agent contacted with the cell.

23. The composition of claim 22,

    i) wherein the agent is a known therapeutic agent; or

    ii) wherein the agent is a candidate therapeutic agent.

24. A method of assessing whether differential expression of one or more condensate components by a cell resistant to an agent causes or contributes to the resistance, comprising:

    i) providing an agent-resistant cell, or a condensate comprising a differential amount of a condensate component or fragment thereof that is differentially expressed in an agent-resistant cell, or a condensate comprising a mutant condensate component or fragment thereof corresponding to a mutant condensate component in an agent-resistant cell,

    ii) contacting the agent-resistant cell or the condensate with the agent, and

    iii) assessing localization, concentration, and/or therapeutic activity of the agent, and/or morphology, stability, and/or dissolution of the condensate, as compared to a control.

25. The method of claim 24, wherein the condensate is isolated from the agent-resistance cell.

26. The method of claim 24 or 25, wherein the condensate component or fragment thereof that is differentially expressed in the agent-resistant cell, or the mutant condensate component or fragment thereof, is a target of the agent.

27. The method of claim 24 or 25, wherein the condensate component or fragment thereof that is differentially expressed in the agent-resistant cell, or the mutant condensate component or fragment thereof, is not a target of the agent.

28. The method of any one of claims 24-27, wherein the control is any of below:

    i) a corresponding cell not resistant to the agent,

    ii) a corresponding condensate not comprising a differential amount of the condensate component or fragment thereof,

    iii) a corresponding condensate not comprising the mutant condensate component or fragment thereof,

    iv) the morphology, stability, and/or dissolution of a corresponding condensate not contacted with the agent,

    v) the agent-resistant cell or the condensate contacted with a second agent.

29. The method of any one of claims 24-28, wherein the agent-resistant cell is a cancer cell.

30. The method of any one of claims 24-29, wherein the condensate component or fragment thereof is over-expressed in the agent-resistant cell, and wherein the condensate comprising the over-expressed condensate component or fragment thereof has a larger volume compared to a corresponding condensate that does not comprise the over-expressed condensate component or fragment thereof.

31. The method of any one of claims 24-30, further comprising contacting the agent-resistant cell or the condensate with a second agent, and assessing localization, concentration, and/or therapeutic activity of the second agent, and/or morphology, stability, and/or dissolution of the condensate.

32. The method of claim 31, wherein the second agent counters one or more effects of the resistance to the agent.

33. The method of claim 32, wherein countering the one or more effects of the resistance to the agent comprises one or more of:

    i) the second agent reduces the size of the condensate over-expressing the condensate component or fragment thereof,

    ii) the second agent dissolves the condensate,

    iii) the second agent binds to the condensate component or fragment thereof differentially expressed in the agent-resistant cell, or the mutant condensate component or fragment thereof in the agent-resistant cell, and

    iv) the second agent has higher condensate partition property compared to the agent.