CLAIMS

WHAT IS CLAIMED IS:

1. A method of isolating biomolecules from at least one region of interest on a planar tissue section on a solid substrate for sequencing or analysis, comprising:

applying a first mask non-specifically to the planar tissue section on the solid substrate;

applying a second mask selectively to the planar tissue section on the solid substrate, wherein the second mask covers at least one region to be excluded in the planar tissue section and circumscribes the at least one region of interest in the planar tissue section; and

solubilizing cellular components by selectively lysing cells within the at least one region of interest by applying an extraction solution to the at least one region of interest,

wherein the second mask is a chemical mask and provides a barrier that inhibits cell lysis and solubilization of the cellular components outside of the at least one region of interest.

2. The method of claim 1, wherein the at least one region of interest has a diameter of less than 1 millimeter.

3. The method of claim 1, wherein the second mask inhibits contact between the extraction solution and the at least one region of interest.

4. The method of claim 1, further comprising isolating at least one solubilized cellular component from the at least one region of interest.

5. The method of claim 1, wherein:

the tissue section comprises two or more regions of interest; and

cellular components are solubilized and cells are selectively lysed separately within each region of interest.

6. The method of claim 1, wherein the first mask comprises a fluorocarbon and/or an acrylate.

7. The method of claim 6, wherein the first mask comprises a fluorocarbon.

8. The method of claim 6, wherein the first mask comprises an acrylate.

9. The method of claim 6, wherein the first mask comprises a fluoroacrylate.

10. The method of claim 1, wherein the second mask comprises an acrylate.

11. The method of claim 10, wherein the second mask further comprises a photoinitiator.

12. The method of claim 6, wherein the second mask comprises an acrylate.

13. The method of claim 10, wherein the second mask is applied to the tissue section using an ink-jet delivery device.

14. The method of claim 12, wherein the second mask is applied to the tissue section using an ink-jet delivery device.

15. The method of claim 1, wherein the first mask has a contact angle to water of at least 110°.

16. The method of claim 1, wherein the first mask has a contact angle to water of about 140°.

17. The method of claim 7, wherein the first mask has a contact angle to water of about 140°.

18. The method of claim 2, wherein a size of the at least one region of interest is less than 100 microns.

19. The method of claim 1, wherein the at least one region of interest is defined by a computer.

20. The method of claim 1, wherein the at least one region of interest is defined by a user.