

CLAIMS

We Claim:

1. A method for retrieval and processing of material from a sample, the method comprising:

coupling with an adaptor;

establishing communication between the adaptor and a capture region of a capture substrate containing material derived from the sample;

generating a volume of target material upon processing the sample with a set of operations, wherein the set of operations comprises:

lysing a set of cells of the sample, thereby releasing a target material from the set of cells,

capturing the target material at a first set of functionalized particles,

performing a reverse transcription operation with the target material,

thereby generating a set of target molecules, and

coupling the first set of functionalized particles with a first set of magnetic particles;

applying a force to at least one of the adaptor and the capture substrate, thereby transferring a-the volume of a-the target material from the capture substrate to the adaptor by way of the first set of magnetic particles;

displacing the adaptor from the capture substrate, thereby retrieving the volume of the target material from the capture substrate; and

delivering the volume of the target material from the adaptor to a process container.

2. The method of Claim 1, wherein the capture region defines a set of microwells, the method comprising capturing a-the set of cells at the set of microwells in single-cell format and co-capturing a-the first set of functionalized particles with the set of cells at the set of microwells.

3. The method of Claim 2, further comprising ~~lysing the set of cells, thereby~~ releasing the target material from the set of cells for binding with the set of functionalized particles.
4. The method of Claim 3, wherein the target material comprises at least one of nucleic acid content and protein content derived from lysed cells of the set of cells.
5. The method of Claim 1, wherein coupling with the adaptor comprises interfacing a pipette interface with a first magnet and transmitting the first magnet into a cavity of the adaptor, wherein the target material comprises cell-derived content bound to ~~the first set of functionalized~~ magnetic particles captured at the capture region, and wherein applying the force comprises applying a magnetic force, thereby attracting the target material to an exterior surface of the adaptor.
6. The method of Claim 5, wherein delivering the volume of the target material from the adaptor to the process container comprises positioning the adaptor, coupled with the first magnet, within the process container.
7. The method of Claim 6, further comprising bringing a second magnet in proximity to a wall of the process container, thereby attracting the target material from the adaptor to the wall of the process container.
8. The method of Claim 7, wherein delivering the volume of the target material from the adaptor to the process container comprises displacing the first magnet from the adaptor, thereby allowing release of the target material from the adaptor and toward the wall of the process container proximal the second magnet.
9. The method of Claim 8, further comprising displacing the second magnet away from the wall of the process container, and with a pipette tip coupled to the pipette interface, extracting the volume of the target material from the process container.

10. The method of Claim 9, wherein the wall of the process container comprises a planar surface at the wall and comprises a curved surface away from the wall, the planar surface and the curved surface tapering toward a base of the process container, and wherein extracting the volume of target material comprises delivering the pipette tip along the curved surface toward the base of the process container.

~~11. The method of Claim 1, further comprising generating the volume of target material upon processing the sample with a set of operations, wherein the set of operations comprises:~~

~~lysing a set of cells of the sample, thereby releasing mRNA content from the set of cells;~~

~~capturing mRNA content at a first set of functionalized particles;~~

~~performing a reverse transcription operation with the mRNA content, thereby generating a set of target molecules;~~

~~coupling the first set of functionalized particles with a second set of magnetic particles; and~~

~~transferring the set of target molecules to the adaptor, by applying a magnetic force to the second set of magnetic particles.~~

~~1211.~~ The method of Claim 1, ~~further comprising generating the volume of target material upon processing the sample with a set of operations,~~ wherein the set of operations further comprises:

~~lysing a set of cells of the sample, thereby releasing mRNA content from the set of cells;~~

~~capturing mRNA content at a first set of functionalized particles;~~

~~performing a reverse transcription operation with the mRNA content, thereby generating a set of target molecules;~~

~~cleaving the set of target molecules from the first set of functionalized particles;~~

and

~~coupling the set of target molecules with a the second set of magnetic particles;~~

and

~~transferring the set of target molecules to the adaptor, by applying a magnetic~~

force to the second set of magnetic particles.

13. — A system for retrieval and processing of material from a sample, the system comprising:

an adaptor configured to interface with a capture region of a capture substrate for capturing particles in single-particle format within a set of wells, wherein the adaptor comprises a first region configured to interface with the capture region, a second region, and a cavity extending from the first region to the second region;

a magnet complementary to the cavity of the adaptor; and

a support structure coupled to the magnet and providing a set of operation modes for movement of the adaptor relative to the capture substrate.

14. — The system of Claim 13, wherein the adaptor defines a sleeve for the magnet and comprises a surface preventing entrapment of magnetic particles within features of the surface.

15. — The system of Claim 13, wherein the adaptor comprises a protrusion extending from the second region of the adaptor, and wherein the set of operation modes of the support structure comprises an uncoupling operation mode for uncoupling the adaptor from the magnet.

16. — The system of Claim 15, wherein the support structure comprises a plunger in communication with the protrusion and configured to apply a displacement force upon activation of the plunger.

17. — The system of Claim 15, wherein the support structure comprises a coupling interface to a pipettor component of an automated pipetting subsystem.

18. — A system for retrieval and processing of material from a sample, the system comprising:

an adaptor configured to interface with a capture region of a capture substrate for

~~capturing particles in single-particle format within a set of wells, wherein the adaptor comprises a first region configured to interface with the capture region, a second region, and a cavity extending from the first region to the second region; and~~

~~a support structure coupled to the adaptor and providing a set of operation modes for movement of the adaptor relative to the capture substrate.~~

~~19.—The system of Claim 18, further comprising a magnet coupled to the support structure, wherein the adaptor defines a sleeve for the magnet and comprises a surface preventing entrapment of magnetic particles within features of the surface~~

~~20.—The system of Claim 18, wherein the adaptor comprises a vent configured to prevent entrapment of gas between the adaptor and the capture region.~~