

downward facing surface of the cover is parallel or approximately parallel to the first surface of the substrate; a fill port disposed along the inner surface of the cover, the fill port configured for at least partially filling the cavity when the cover is attached to the base, wherein the downward facing surface comprises a central area, which is transparent to provide optical access to the plurality of reaction regions..

Another aspect relates to a case for containing a plurality of biological samples, the case comprising: a base; a substrate attachable to the base, the substrate comprising a plurality of reaction regions disposed along a first surface of the substrate, the reaction regions being configured to receive one or more biological samples; and a cover comprising a downward facing surface, the cover configured to be attached to the base such that the base and cover together provide a cavity containing the substrate, the cover configured during use so that the downward facing surface of the cover is parallel or approximately parallel to the first surface of the substrate; a plurality of tabs located on an upward facing surface of the base, wherein the substrate is attached to the base by physical contact between at least some of the tabs and the substrate, wherein the downward facing surface comprises a central area, which is transparent to provide optical access to the plurality of reaction regions.

Another aspect relates to a method, comprising: providing the components of a case for containing a plurality of biological samples, the case comprising: a base; a substrate comprising a plurality of reaction regions disposed along a first surface; and a cover comprising a downward facing surface and a fill port disposed along the inner surface; loading at least some of the reaction regions with one or more biological samples; subsequent to loading, attaching the cover to the base to form a cavity containing the substrate, such that the downward facing surface of the cover is parallel or approximately parallel to the first surface of the substrate at least partially filling the cavity with a fluid such that the fluid covers the first surface of the substrate, by physical contact between at least some of the tabs and the substrate wherein the downward facing surface comprises a central area, which is transparent to provide optical access to the plurality of reaction regions.

Brief Description of the Drawings

Embodiments of the present invention may be better understood from the following detailed description when read in conjunction with the accompanying drawings. Such embodiments, which are for illustrative purposes only, depict novel and non-obvious aspects of the invention. The drawings include the following figures:

FIG. 1 is a system for processing a plurality of biological samples according to embodiments of the present invention.

WHAT IS CLAIMED IS:

1. A case for containing a plurality of biological samples, the case comprising:
a base;

a substrate attachable to the base, the substrate comprising a plurality of reaction
5 regions disposed along a first surface of the substrate, the reaction regions being configured to
receive one or more biological samples; and

a cover comprising a downward facing surface, the cover configured to be attached to
the base such that the base and cover together provide a cavity containing the substrate, the
cover configured during use so that the downward facing surface of the cover is parallel or
10 approximately parallel to the first surface of the substrate;

a fill port disposed along the inner surface of the cover, the fill port configured for at
least partially filling the cavity when the cover is attached to the base;

wherein the downward facing surface comprises a central area, which is transparent to
provide optical access to the plurality of reaction regions.

2. The case of claim 1, wherein the downward facing surface further includes ~~a central
area and~~ a recessed area disposed about the central area, the central area configured to cover
the reaction regions, the recessed area being offset from the central area in a direction normal
to the downward facing surface.

~~3. The case of claim 2, wherein the central area is transparent to provide optical access to
the plurality of reaction regions.~~

~~4.3.~~ The case of claim 1, wherein the substrate comprises a second surface opposing the
first surface, and the plurality of reaction regions comprises a plurality of through-holes
disposed between the first and second surfaces, the through-holes configured to receive one or
more biological samples.

~~5.4.~~ The case of claim 1, further comprising a fluid, wherein the cover is attached to the
base and the fluid is in contact with the first surface, the second surfaces, and a downward
facing surface of the cover.

~~6.5.~~ The case of claim 2, wherein the recessed area is configured to receive gas from the
central area that is released by a fluid in the cavity when the cover is attached to the base.

~~7.6.~~ The case of claim 1, wherein the base comprises a plurality of support pads disposed near a periphery of an upward facing surface of the base, wherein support pads maintain the substrate over the upward facing surface of the base.

~~8.7.~~ The case of claim ~~76~~, wherein the substrate is maintained by a contact force between the substrate and one or more of the support pads.

~~9.8.~~ The case of claim ~~76~~, wherein support pads comprise a first group of support pad and a second group of support pad distinct from the first group of support pads, wherein the substrate is held by a contact force between the substrate and the first group of the support pads and a spacing between the substrate and the upward facing surface is maintained by the second group of support pads.

~~10.9.~~ The case of claim ~~65~~, wherein the received gas comprises a plurality of air bubbles.

~~11.10.~~ The case of claim 1, wherein approximately parallel means downward facing surface of the cover is parallel to within 3 degrees of the first surface of the substrate.

~~12.11.~~ The case of claim 1, further comprising a plurality of tabs located on an upward facing surface of the base, wherein the substrate attached to the base by physical contact between at least some of the tabs and the substrate.

~~13.12.~~ The case of claim ~~1211~~, wherein the plurality of tabs comprise a first set of tabs and a second set of tabs, a surface of the substrate disposed on a top surface of each tab of the first set of tabs, the substrate disposed between at least two tabs of the second set of tabs.

~~14.13.~~ The case of claim ~~1312~~, wherein the first set of tabs protrude from the upward facing surface of the base by a first distance and the second set of tabs protrude from the upward facing surface of the base by a second distance, the second distance being greater than the first distance.

~~15.14.~~ A case for containing a plurality of biological samples, the case comprising:

a base;

a substrate attachable to the base, the substrate comprising a plurality of reaction regions disposed along a first surface of the substrate, the reaction regions being configured to receive one or more biological samples; and

a cover comprising a downward facing surface, the cover configured to be attached to the base such that the base and cover together provide a cavity containing the substrate, the cover configured during use so that the downward facing surface of the cover is parallel or approximately parallel to the first surface of the substrate;

5 a plurality of tabs located on an upward facing surface of the base, wherein the substrate is attached to the base by physical contact between at least some of the tabs and the substrate;

wherein the downward facing surface comprises a central area, which is transparent to provide optical access to the plurality of reaction regions.

10 ~~16.15.~~ The case of claim ~~15~~14, wherein the plurality of tabs comprise a first set of tabs and a second set of tabs, a surface of the substrate disposed on a top surface of each tab of the first set of tabs, the substrate disposed between at least two tabs of the second set of tabs.

15 ~~17.16.~~ The case of claim ~~16~~15, wherein the first set of tabs protrude from the upward facing surface of the base by a first distance and the second set of tabs protrude from the upward facing surface of the base by a second distance, the second distance being greater than the first distance.

~~18.17.~~ A method, comprising:

providing the components of a case for containing a plurality of biological samples, the case comprising:

20 a base;

a substrate comprising a plurality of reaction regions disposed along a first surface;

and

a cover comprising a downward facing surface and a fill port disposed along the inner surface;

25 loading at least some of the reaction regions with one or more biological samples;

subsequent to loading, attaching the cover to the base to form a cavity containing the substrate, such that the downward facing surface of the cover is parallel or approximately parallel to the first surface of the substrate

at least partially filling the cavity with a fluid such that the fluid covers the first surface
30 of the substrate;

wherein the downward facing surface comprises a central area, which is transparent to provide optical access to the plurality of reaction regions.

5 ~~19.18.~~ The method of claim ~~18~~17, further comprising attaching the substrate to the base such that there is gap between a downward facing surface of the substrate and an upward facing surface of the base.

~~20.19.~~ The method of claim ~~19~~18, wherein the upward facing surface of the base comprises a plurality of tabs located on an upward facing surface of the base, wherein the substrate attached to the base by physical contact between at least some of the tabs and the substrate.

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