WHAT IS CLAIMED IS:

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

a base;

a substrate attached to the base, the substrate comprising a plurality of reaction regions configured to receive one or more biological samples; and

a cover comprising an inner surface, the cover configured to be attached to the base; and

wherein the inner surface 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 inner surface;

wherein during use the base, the central area, and the recessed area together provide a cavity containing the substrate;

wherein the recessed area comprises a trough disposed along a perimeter of the central area, the trough comprising a bottom that is offset from the central area in a direction normal to the inner surface; and

wherein the bottom surface has a depth that varies along the perimeter.

2. The case of claim 1, wherein the central area is transparent to provide optical access to the plurality of reaction regions.

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

4. The case of claim 3, 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 an inner surface of the cover.

5. The case of claim 1, 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.