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(57) Abstract: A cell culture cartridge is provided comprising a plurality of zones geometrically configured to provide for symmetrical fluid flow with each of the plurality of zones to avoid dead areas in flow within each of the plurality of zones. In certain embodiments, at least eight inlets are provided, with an inlet positioned at each corner of the cell culture cartridge. In certain embodiments, a shared outlet is positioned on a top surface of the cell culture cartridge.

