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Microfluidic devices for separation of human blood samples VIRGINIA VANDELINDER, ALEX GROISMAN, UCSD — We describe design and operation of microfluidic devices for separation of human blood. The first device separates plasma from the cellular elements of blood using size exclusion in a cross-flow. The device generates 1 uL of high-quality plasma four minutes after loading the blood sample and can operate continuously for at least one hour. The second device separates white bloods cells (WBC) from red blood cells (RBC) using perfusion in a continuous cross-flow. The microfluidic device is tested with a suspension of polystyrene beads and is shown to efficaciously exchange the carrier medium while retaining all beads. The RBC content of the blood sample is reduced about 4000-fold while 98 percent of WBCs are retained with a resultant WBC : RBC ratio of 2.4 at the device outlet.

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