

BLOOD TREATMENT SYSTEMS AND METHODS

ABSTRACT

The present invention generally relates to hemodialysis and similar dialysis
5 systems, including a variety of systems and methods that would make hemodialysis more
efficient, easier, and/or more affordable. One aspect of the invention is generally
directed to new fluid circuits for fluid flow. In one set of embodiments, a hemodialysis
system may include a blood flow path and a dialysate flow path, where the dialysate flow
path includes one or more of a balancing circuit, a mixing circuit, and/or a directing
10 circuit. Preparation of dialysate by the preparation circuit, in some instances, may be
decoupled from patient dialysis. In some cases, the circuits are defined, at least partially,
within one or more cassettes, optionally interconnected with conduits, pumps, or the like.
In one embodiment, the fluid circuit and/or the various fluid flow paths may be at least
partially isolated, spatially and/or thermally, from electrical components of the
15 hemodialysis system. In some cases, a gas supply may be provided in fluid
communication with the dialysate flow path and/or the dialyzer that, when activated, is
able to urge dialysate to pass through the dialyzer and urge blood in the blood flow path
back to the patient. Such a system may be useful, for example, in certain emergency
situations (e.g., a power failure) where it is desirable to return as much blood to the
20 patient as possible. The hemodialysis system may also include, in another aspect of the
invention, one or more fluid handling devices, such as pumps, valves, mixers, or the like,
which can be actuated using a control fluid, such as air. In some cases, the control fluid
may be delivered to the fluid handling devices using an external pump or other device,
which may be detachable in certain instances. In one embodiment, one or more of the
25 fluid handling devices may be generally rigid (e.g., having a spheroid shape), optionally
with a diaphragm contained within the device, dividing it into first and second
compartments.

(No suitable figure)