

B₉TOTAL EXCHANGE PERFUSION OF RATS WITH HIGHLY CONCENTRATED
FLUOROCARBON EMULSIONS

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The Fluosol-DA 20% w/v-type first-generation fluorocarbon emulsions proved to be generally well tolerated intravenously in large amounts, but display limited O₂-carrying capacity, owing to their low fluorocarbon content (11% by volume). As a consequence, the patients had to breathe a highly oxygen-enriched atmosphere, considered as unsafe. It was therefore deemed necessary to investigate whether significantly more concentrated emulsions were as well tolerated.

Two 100% w/v stem emulsions were prepared, based on F-octylbromide (DuPont) and on bis(F-hexyl)ethene (Atochem) using egg yolk lecithins (Kabi-Vitrum, Fresenius) as the surfactant. They were tested in various dilutions, after adjustment of the osmotic and oncotic pressures and pH, by close-to-total exchange-perfusion (Hct ~3%) of conscious, catheterized rats. These concentrated emulsions (up to 50% w/v or 27% v/v) also permitted the decrease of the inspired oxygen fraction to a safe level. The rats were seen to be remarkably alert, and apparently unconcerned by the dramatic changes that were occurring in the composition of their intravascular fluid. The percentage of definitive survival was very high, exceeding 80%. The hematocrit was restored within 8-10 days. Details concerning the purity and the chemical and biological inertness of the fluorocarbons, the preparation, formulation and characterization of the emulsions, and the exchange-perfusion protocol, will be presented. The tolerability of such concentrated emulsions opens the way to significantly more efficacious intravascular oxygen carriers. The use of even more concentrated emulsions, providing very high fluorocarbon content and O₂-carrying capacity per unit volume, can be envisaged for local administration, as in diagnosis, angioplasty, etc..