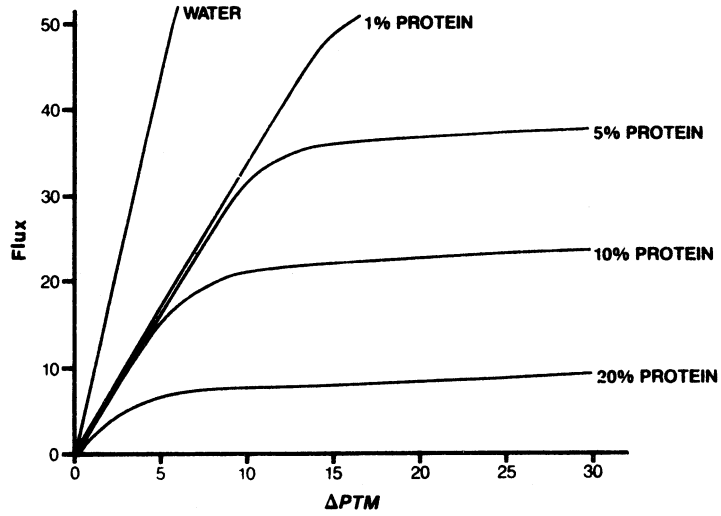

Figure 11.24. Filtration flux as a function of transmembrane pressure at varying solute concentrations. (With permission, from R. S. Tutunjian, in M. Moo-Young, ed., *Comprehensive Biotechnology*, Vol. 2, Elsevier Science, London, 1985.)

of compounds with MW $< 10^3$, retains compounds with MW $> 10^5$, and partially retains compounds of $10^3 <$ MW $< 10^5$.

Three major membrane configurations are depicted in Fig. 11.26: hollow fibers, flat sheets, and spiral-wound cartridges. Fiber cartridges provide a large surface-to-volume ratio. However, they plug more easily than the other two configurations. Flat-plate configurations are easy to construct and allow easy membrane replacement. The channel width can be altered to reduce plugging problems. Membrane support must be added to allow operation at higher pressures. Flat-plate systems have a low membrane surface-to-volume ratio. Spiral cartridges contain rolled membranes and are essentially flat-plate systems configured to increase the surface-to-volume ratio. Most UF membranes operate with $\Delta P < 5$ to 7 bars and MF membranes at a slightly lower ΔP.

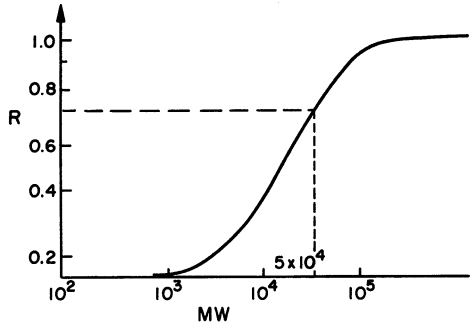

Figure 11.25. Rejection coefficient as a function of the molecular weight of the solute.