

Kinetics-like equation for cerebrospinal fluid-blood diffusion models.

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Introduction: The diffusion of proteins from the blood to the cerebrospinal fluid is influenced by its molecular weight and by the intrinsic properties and biological properties of the protein.

Objective: Determinate the diffusion of new proteins as they pass from the blood to the cerebrospinal fluid.

Materials and methods: Paired samples of serum and cerebrospinal fluid were taken from normal subjects to quantify albumin and proteins of the lectin pathway of the complement system. The distribution of these with regard to the value of $Q_{\text{Albumina}} = (\text{Albumin in serum} / \text{albumin in cerebrospinal fluid})$ was evaluated because this protein is used as a marker of the passage of the barrier.

Results: It was observed that some of these describe a saturation pattern which resembles the curves that describe the Michalis-Menten reaction of enzymatic activity. This led to the consideration of two constants that will help to characterize the behavior of these proteins by spreading to the cerebrospinal fluid: the maximum Q of the protein, which is the maximum proportion found empirically between the concentrations in blood and cerebrospinal fluid and the value K_{cdw} which is the value of the average diffusion speed of Q albumin when the semi-maximal value of the Q of the protein under study is obtained.

Conclusions: Empirically obtained constants will help the characterization and differentiation of the diffusion of these new proteins as they pass from the blood to the cerebrospinal fluid.

Key words: diffusion of proteins, blood, cerebrospinal fluid