Colloidal transport is the basis of a wide range of processes that influence our daily lives. In the biomedical field, it is key for the dispersion of macromolecules in pharmaceutical applications (1). In oil recovery, it is essential for enhanced oil recovery techniques (2). In environmental engineering, it plays a crucial role in the transport of pollutants through porous media (3). In industry, it is used for the production of various products, such as paper and textiles (4).

To understand colloidal transport, we need to consider the fundamental principles that govern the behavior of colloids in porous media. These principles include the importance of fluid flow, pressure gradients, and surface interactions. The interaction between the colloidal particles and the solid matrix of the porous medium is a key aspect of colloidal transport. This interaction can significantly affect the transport of colloids, leading to phenomena such as particle deposition, erosion, and re-deposition. Understanding these processes is crucial for optimizing the performance of various applications, such as filtration, remediation, and oil recovery.

In biological systems, colloidal transport is also important. The transport of colloids in blood vessels and the permeability of capillaries are critical for the delivery of macromolecules to the target tissues.

To study colloidal transport, researchers use a variety of methods, including experimental techniques and computational simulations. These methods help to understand the complex behavior of colloids in porous media and to design more effective strategies for colloidal transport.

In summary, colloidal transport is a multifaceted field that has significant implications in various fields, from oil recovery to medicine. Further research is needed to improve our understanding of colloidal transport and to develop new technologies that can harness this phenomenon for practical applications.