

Old proteins, new roles. The hydrogen atom of biology turns into a biotechnological tool

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For many years, globins have been one of the preferred toys in the playground of biophysicists, where many of the concepts of biological physics have been developed and tested. These proteins are generally easy to get, easy to handle, easy to modify, or at least they look so. However, far from being trivial systems, the insight we have gained on these macromolecules over several decades of investigations, has given us a profound understanding of how proteins work in general. Over the years, a variety of physical methods, both experimental and theoretical, have been applied to investigate structural and dynamical properties of globins. Sophisticated concepts such as allostery and conformational substates were introduced to explain the complex and often unexpected behavior of protein dynamics. Perhaps not surprisingly, globins have been discovered in all organisms and kingdoms, with elusive functions that are largely yet to be understood. Their versatile properties allow fancy biotechnological applications that extend beyond the physical chemistry of the molecules and reach the drug design field, turning them into theranostic devices.