**Supplementary Figure 1.** The conversion between the aldehydic and hydrate forms of a generic aldehyde in aqueous media.

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**Supplementary Figure 1 Notes:**

The formation of a generic hydrate from a generic aldehyde in aqueous media at physiological pH and above (pH ≥ 7) is depicted. In this case, the lone pair on the oxygen of a water molecule acts as a nucleophile to attack the electrophilic carbonyl carbon of an aldehyde. As this bond is forming, the π-bond of the carbonyl group breaks, putting anionic character on the oxygen which will then abstract a proton from an aqueous acid. The protonated OH group then reacts with an aqueous base. Thus, a proton is abstracted and a proton is donated. This process forms the hydrate. The entire process is reversible, such that aldehyde goes to hydrate and hydrate goes to aldehyde.