

The role of chemical engineering in medicinal research including Alzheimer's - DTU Orbit (08/11/2017)

The role of chemical engineering in medicinal research including Alzheimer's

Various disciplines of chemical engineering, especially thermodynamics and kinetics, play an important role in medicinal research and this has been particularly recognized during the last 10–15 years (von Stockar and van der Wielen, *J Biotechnol* 59:25, 1997; Prausnitz, *Fluid Phase Equilib* 53:439, 1989; Prausnitz, *Pure Appl Chem* 79:1435, 2007; Dey and Prausnitz, *Ind Eng Chem Res* 50:3, 2011; Prausnitz, *J Chem Thermodynamics* 35:21, 2003; Tsivintzelis et al. *AIChE J* 55:756, 2009). It is expected that during the twenty-first century chemical engineering and especially thermodynamics can contribute as significantly to the life sciences development as it has been done with the oil and gas and chemical sectors in the twentieth century. Moreover, it has during the recent years recognized that thermodynamics can help in understanding diseases like human cataract, sickle-cell anemia, Creutzfeldt- Jacob ("mad cow" disease), and Alzheimer's which are connected to "protein aggregation." Several articles in the Perspectives section of prominent chemical engineering journals have addressed this issue (Hall, *AIChE J* 54:1956, 2008; Vekilov, *AIChE J* 54:2508, 2008). This work reviews recent applications of thermodynamics (and other areas of chemical engineering) first in drug development and then in the understanding of the mechanism of Alzheimer's and similar diseases.

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