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Are there simple and effective methods to improve the physical stability of amorphous drugs

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It is estimated that nearly 40% of marketed drug substances in crystalline form and 75% of drug candidates are poorly soluble in water and consequently have lower bioavailability. A possible solution of this problem is to convert them to the amorphous form. This is justified by the fact that the logarithm of the ratio of crystal solubility to amorphous solubility is proportional to difference between the Gibbs free energy of crystal and amorphous state, respectively. Since the Gibbs free energy of amorphous state is always higher than crystal, thus drugs prepared in amorphous form exhibit a better water solubility than their crystalline counterparts. However, there is one serious drawback of using this strategy because the amorphous drugs are, in general, physically unstable systems. It means that they may simply re-crystalize during storage losing their original advantages. Thus, main challenge in working with the amorphous drugs is the enhancement of their physical stability. In this presentation I will talk about various methods which have been developed in our laboratory to improve the physical stability of amorphous drugs.

Biography

Marian Paluch has obtained his PhD in 1998 in the field of the Condensed Matter Physics from University of Silesia, Poland. He was appointed as a Visiting Scientist at the Max Planck Institute for Polymer Research in Mainz, the Naval Research Laboratory in Washington DC, the University of Akron, the Hebrew University, the University of Pisa and the University of Tennessee. He is currently the Head of the Biophysics and Molecular Physics Department at University of Silesia. He has published more than 320 papers in reputed journals and has been serving as an Academic Editor in *AIP Advances* since 2010.

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