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Robotic Crystallization and Precipitation Point Proximity. Shahzad Majeed, Tongqing Zhou, Peter D. Kwong, Vaccine Research Center NIAID/NIH, 40 Convent Dr., Bethesda MD 20892.

Proteins tend to crystallize more frequently close to their precipitation points. In this experiment, we used three commercial screens, the Hampton Crystal Screen, the Wizard I screen and the Precipitant Synergy screen, in combination with robotic systems to test how precipitation point proximity affects crystallization. Variations of the three commercial screens were made with different degrees of precipitant optimization. These different screens were tested with five different proteins, three that crystallized readily (bovine pancreatic trypsin inhibitor, concanavalin A, and hen egg white lysozyme) and two that crystallized infrequently (bovine serum albumin and ovalbumin). We found that for readily crystallized proteins, a sparse grid of three to four precipitant concentrations was sufficient to maximize the number of unique conditions that gave crystals, and further optimization was of minimal benefit. For difficult to crystallize proteins, additional precipitant optimization doubled the number of unique conditions producing crystals. Thus the appropriate degree of precipitation point optimization was found to be dependent on the overall frequency with which each particular protein crystallized.