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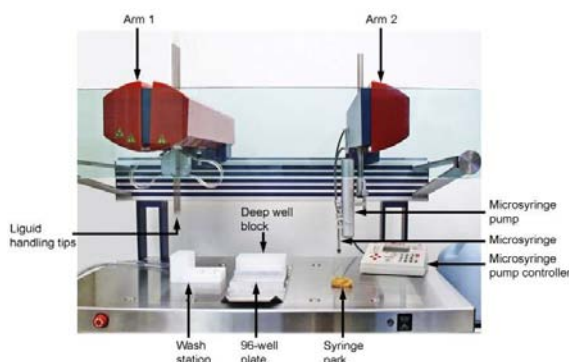
High-Throughput Robot for Crystallization in Lipid Mesophase

Manufacturer: SIAS, AG, modified and assembled in the laboratory of Professor Martin Caffrey (see Ref)

Primary Use: Carrying out protein crystallization experiments using lipidic mesophases.

Description:

The robot was designed and built first and foremost to perform automated crystallization of membrane proteins using the *in meso* method However, it also works with other crystallization protocols. The robot was built based on Xantus, a commercially available liquid handling robot (Sias AG, Switzerland; Zinsser NA, Northridge, CA, USA). The open style, modular design and software flexibility of the Xantus allowed its adaptation to perform the steps needed for *in meso* crystallization. The standard Xantus robot consists of a 1 X 0.7 m deck with two independent arms. Arm 1 is used for liquid aspiration and dispensing, while arm 2 is typically a plate gripper and moving device. Arm 1 is equipped with four small-volume liquid-handling tips for pick-up and placement of precipitant solutions. Arm 2 handles the viscous protein/lipid mesophase. To this end, the gripper device uses a motor-driven positive-displacement Hamilton syringe (UMP II with Micro4 controller, World Precision Instruments, Sarasota, FL, USA). The controller for the latter was interfaced to the Xantus through an RS-232 cable. The positional accuracy of arm 2 was raised by increasing the gear ratio of the z motor by a factor of 8.

This LCP robot has been installed in the JCIMPT laboratory of Professor Ray Stevens on long-term loan from Ohio State University as part of collaboration with Professor Caffrey's laboratory. This robot is used routinely for preparing crystallization experiments on GPCR protein detergent complexes; it was used in producing high quality crystals of the GPCR;s β2-adrenergic receptor and Adenosine 2A receptor resulting in the determination of their 3-dimensional structure.

This robot is currently not available commercially. Those interested in building a system can contact Sias, AG. JCIMPT is working with Sias, AG and Zinsser NA to design and manufacture a new production version of the robot.

References

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