

Title: Integrated Biology Lab (iLab) [0-0-30-15]

Content :

(1) Media preparation and checking the sterility of the plates/ slants/ stabs/liq medium; (2) Streaking, plating, check purity, and colony characteristics; (3) Gram staining, motility, spore staining, capsule staining, 16s rDNA amplification from the given strain, sequencing, and phylogeny; (4) Plasmid isolation, Gel running, and DNA quantification; (5) Amplification of gene of interest by PCR, Gel running, and quantification; (6) Restriction digestion and cloning into pET expression plasmid; (7) Transformation into expression host such as BL21 (DE3) strain; (8) Growth curve and growth kinetics; (9) Protein induction and expression; Purification of the protein by affinity chromatography; (10) Guanidine hydrochloride induced folding (if Stopped-Flow is available) and unfolding by; (11) Enzyme activity measurement; Enzyme Kinetics; (12) Biophysical properties of the protein/s under study using bioinformatics tools and prediction algorithms in ExPASy; (13) CD and Fluorescence; Near and far UV spectroscopy-2; Temperature induced folding and unfolding.

Texts / References:

1. Cappuccino, J. G., & Welsh, C. (2016). Microbiology: a Laboratory Manual. Benjamin-Cummings Publishing Company
2. Collins, C. H., Lyne, P. M., Grange, J. M., & Falkinham III, J. (2004). Collins and Lyne, Microbiological Methods (8th ed.)
3. Arnolds; Tille, P. M., & Forbes, B. A. (2014) Bailey & Scott Diagnostic Microbiology
4. Molecular Cloning by Sambrook and Russell - lab manual. 4th edition; Cold Spring Harbor, 2012
5. An Introduction to Practical Biochemistry, David Plummer | 3rd Edition
6. Wilson And Walkers Principles And Techniques Of Biochemistry And Molecular Biology 8Ed (Sae) (Pb 2018)
7. Introduction to Experimental Biophysics, Jay L. Nadeau. CRC Press 2015
8. Principles of Fluorescence Spectroscopy by J R Lakowicz. Springer, 2006
9. Biophysical Chemistry Part II : Techniques For The Study Of Biological Structure And Function, by Charles R. Cantor (Author), Paul R. Schimmel (Author), 2008
10. Spectrophotometry and Spectrofluorimetry: A Practical Approach Second Edition Edited by Michael G. Gore, OUP Press, 2000.