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| 课程名（Coursename） Chemical Biology II – Proteins and Metalloproteins  课程代码（Coursenumber） C2  课程对象（Audience） Undergraduate  开课教师（Teacher） Dr S. E. Jackson and Dr P. D. Barker  学期（Semester） L 4–8  课程描述（Description）） Proteins are the most diverse of biological macromolecules from both a structural and functional point of view. Starting with just the twenty naturally occurring amino acids it is possible to form massive structures such as the 34,350 residue long, 2M Da giant muscle protein titin, in addition to small but potent structures such as the 60-residue long Textilinin-1 snake venom.  The first part of the course describes in detail the three-dimensional structures of proteins and how it is determined, and lays a strong foundation for the rest of this and other Part III lecture courses. A very wide range of examples will be used to illustrate how the structure and function of proteins are linked, and the underpinning non-covalent chemistry. The importance and widespread use of protein engineering techniques, including recently developed methods for the incorporation of non-natural amino acids into proteins, will be discussed including the engineering of antibodies for use as therapeutic agents to the engineering of haem-containing proteins for nano-electrical circuitry! The marginal thermodynamic stability of the native states of many proteins will be highlighted in addition to the chemical methods that have been used to study it. The consequences of protein instability and the link with disease will be illustrated with a few key examples. The second half of the course will discuss the interplay between protein structure/stability and metal binding from fundamental inorganic perspective, exploring how metal binding can be used to determine protein structure and conversely how protein structure determines metal function. After a brief overview of the principles for which biology has selected metals for different functions, we will examine in more detail, the cases of zinc, iron and copper as structural elements and catalysts. lectures 1–6 Introduction to protein structure, Probes of protein structure: NMR, x-ray crystallography, CD and fluorescence; Manipulating protein structure and function: protein engineering techniques; Measuring protein stability; Factors that govern protein stability; The importance of protein stability: instability, misfolding and disease. lectures 7–12 Metals in biology - binding selectivity and thermodynamics; Zinc proteins; Iron enzymes -harnessing dioxygen chemistry; Copper proteins; Electron transfer in biology.  课时信息（Totalhours）  教参信息（Textbookinfo） 1 Metalloproteomics (Wiley Series in Protein and Peptide Science) by E. A. Permiakov (Hardcover - Apr. 27, 2009) ISBN-13: 978-0470392485 世界各地拥有馆藏的图书馆（OCLC）:95 2 Handbook on Metalloproteins by Ivano Bertini and Astrid Sigel (Hardcover - June 29, 2001) ISBN-13: 978-0824705206 世界各地拥有馆藏的图书馆（OCLC）:150 3 Spectroscopic Methods and Analyses: NMR, Mass Spectrometry, and Metalloprotein Techniques (Methods in Molecular Biology) by Christopher Jones, Barbara Mulloy, and Adrian H. Thomas (Paperback - May 23, 1993) ISBN-13: 978-0896032156 4 Mechanisms of Metallocenter Assembly (Advances in Inorganic Biochemistry, Vol 10) by Robert P. Hausinger, Gunther L. Eichhorn, and Luigi G. Marzilli (Hardcover - Dec. 13, 1995) ISBN-13: 978-0471186328 5 Metal Sites in Proteins and Models: Redox Centres (Springer Desktop Editions in Chemistry) by H.O.A. Hill, Peter J. Sadler, and A.J. Thomson (Paperback - May 14, 1999) ISBN-13: 978-3540655565 |