KN-1

Very large complexes

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KN-2

Powder Diffraction at the Japanese Spallation Source

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KN-3

Protein interactions regulate ubiquitin and SUMO conjugation. Richard G. Hibbert[a], Puck Knipscheer[a]. Anding Huang[b], Rolf Boelens[b], Gretel Buchwald[a], Francesca Mattiroli[a], Titia K. Sixma[a]
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Ubiquitin conjugation has emerged as a major signalling pathway that regulates critical cellular pathways such as DNA repair, transcription and cell cycle. In this process the small ubiquitin protein is covalently conjugated to a lysine on the target protein that is redirected for degradation, interaction or cellular localization.
Since ubiquitin itself has seven lysines, different ubiquitin chains can occur, with different cellular outcomes. The conjugation machinery consists of E1,E2,E3 cascades of enzymes that are balanced by a series of deubiquitinating enzymes or DUBs.
We study the modulation of E2 and E3 enzymes by the components of the system itself, using a combination of protein crystallography and protein interaction studies. Results will be presented on the question of target complexes, target selectivity, chain formation and selection of chain types as well as the asymmetry of E3 RING dimers.

KN-4

Can Nature do what Man can do? The Search for Natural Quasicrystals. Luca Bindi, *Natural History Museum, Division of Mineralogy, University of Florence, Italy*
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The well ordered world of solid materials was forced to reassess its rules when an icosahedral phase of matter was first discovered in the laboratory [1] and the concept of quasicrystals was introduced to explain it [2]. Quasicrystals are solids whose diffraction patterns are composed of Bragg peaks, like periodic crystals, but with symmetries forbidden to crystals. Over the last twenty-five years, more than one hundred examples have been identified, but, until now, all have been produced in the laboratory under controlled conditions ranging from rapid to moderately slow. The search for a naturally-forming quasicrystal began soon after the concept of quasicrystals was introduced. For many years, the search was informal. However, beginning about a decade ago [3], a systematic search was developed that, through planning and much serendipity, led to the discovery this past year of a natural candidate embedded in a rock found in the Koryak Mountains, northern Kamchatka [4]. It should be noted that, when the concept of quasicrystals was first introduced, there was considerable skepticism [5] whether complex quasiperiodic structures could ever form, even under ideal laboratory conditions. Indeed, the first icosahedral phase, i-Al_6Mn, reported by Shechtman et al. [1] exhibited so much disorder that its identification as a quasicrystal was challenged and alternative structural models were proposed [5]. At the time, all known examples of icosahedral alloys were metastable, only obtainable by rapid quenching. Then, highly perfect and more stable quasicrystals, such as i-AlCuFe began to be discovered, showing that quasicrystals can be formed under highly controlled laboratory conditions. Nevertheless, one could not be sure of their long-term stability [6] because they could not be kept in equilibrium at low temperatures or annealed over eons. The discovery of natural quasicrystals could push back the age of the oldest known quasicrystal by orders of magnitude: for example, the host rocks in the Koryak mountain region date from the Triassic, roughly 200 to 250 million years ago. A natural sample would represent the first physical evidence that quasicrystals can form spontaneously under natural conditions, and can remain stable over geologic timescales. From the perspective of condensed matter physics, that the natural quasicrystal, embedded in a matrix of different minerals, remains distinct and so structurally perfect would lend support to the original proposal [2] suggesting that quasicrystals can be as stable as crystals, and, therefore, have equal footing as a stable form of solid matter. From a geological standpoint, the concept of what makes a mineral would have to be amended to include quasicrystalline structures, and the search for other natural candidates may provide a new avenue to discover new stable quasicrystals not yet observed in the laboratory.

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KN-5

The ribosome story. Anders Liljas, *Molecular Biophysics, Lund University, Lund, Sweden*
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Research on protein synthesis or translation emerges during the 40-ties and 50-ties. 1941 it was noticed that high levels of RNA correlated with protein synthesis. Ribosomes were first isolated 1952 and identified as the site of protein synthesis 1957. The name ribosome started to be used 1958. The mRNA was discovered 1956. The need for tRNA was postulated 1956 by Crick in his adaptor hypothesis and shortly thereafter identified by M. Hoagland. From early times the structure with