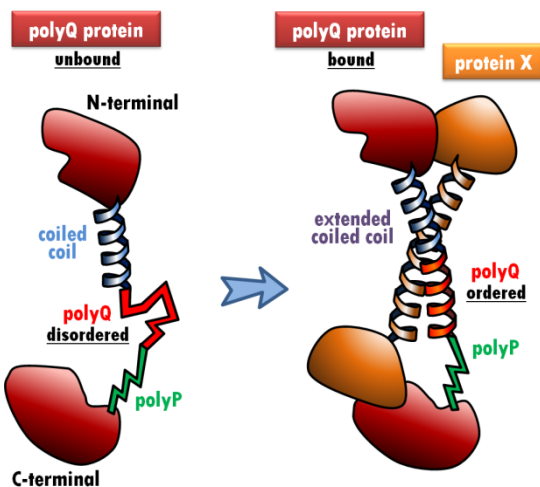


Leading computational biologist joins IMB to investigate the role of genes and proteins in disease

April 1, 2014. Miguel Andrade has been jointly appointed as Full Professor at Johannes Gutenberg University Mainz (JGU) and Adjunct Director at the Institute of Molecular Biology (IMB). Prof. Andrade uses computational methods for studying gene and protein function with an emphasis on molecules related to human disease.

With the vast amount of data generated in modern molecular biology research, powerful methods are needed to understand and make use of the results. For instance, new techniques let researchers model protein interactions, predict how the transcription of genes is regulated, and visualize how genes are expressed, both in health and disease. Prof. Andrade's work spans all these areas, plus data and text mining of the biomedical literature. These strands of research are connected by the computational tools developed and applied by his group to make sense of large data sets from biological experiments.

One such tool is HIPPIE, a database that integrates protein-protein interaction data. Combining information from genomic, phylogenetic and functional sources, for example, Prof. Andrade has shown that stretches of polyglutamine (polyQ) in proteins modulate interactions with other proteins (see



PolyQ modulation of protein-protein interactions. When the polyQ-containing protein (red) interacts with protein X (orange) via a coiled coil interaction, the polyQ adopts a coiled coil conformation, which extends the preceding coiled coil (blue). The polyP region (green) cannot adopt a coiled coil conformation, effectively capping the interaction-dependent conformational change of the polyQ region.

Figure). Abnormal expansion of polyQ can result in pathological protein aggregation, which may contribute to the disease mechanism in various neurodegenerative conditions, such as Huntington's disease or spinocerebellar ataxia.

One of the main goals of Prof. Andrade's work is the prediction of protein and gene function by integrating heterogeneous data. An example of this is his recent observation that microRNA targets and functions can be better predicted using data about the targets of transcriptional suppressor proteins. This finding has been applied to the neural repressor protein REST to identify candidate miRNAs that could act as suppressors of brain cancer.

Another aspect of Prof. Andrade's work concerns the development of methods for data and text mining of the biomedical literature, for example abstracts of scientific papers in the PubMed database. Fast prioritization of hundreds of thousands of PubMed records according to user-defined topics in a matter of seconds allows efficient exploration of the

biomedical corpus, and can be used to sort genes and chemicals according to their relevance to a topic. Prof. Andrade's group has also used PubMed to study economic, linguistic and scientific trends, and to find appropriate reviewers for manuscripts.

Prof. Christof Niehrs, IMB's Founding Director, says the recruitment of Miguel Andrade is a boon for IMB as well as for the wider biology community in Mainz. "Miguel Andrade's computational work ideally complements the wet lab expertise we already have at IMB. As a leader in bioinformatics Miguel is a pivotal asset for the life sciences in Mainz."

Prof. Andrade is joining IMB from the Max Delbrück Center for Molecular Medicine in Berlin, where he has headed the Computational Biology and Data Mining group since 2007. From 2003 to 2007, he was Assistant Professor in the Department of Medicine of the University of Ottawa in Canada, and Scientist and Head of the Bioinformatics Group of the Ottawa Health Research Institute. In addition to being appointed professor in the Faculty of Biology at Johannes Gutenberg University Mainz, Prof. Andrade will join IMB as the Institute's 14th Group Leader.

Further information about Miguel Andrade's research can be found at www.imb.de/andrade.

About the Institute for Molecular Biology gGmbH

The Institute of Molecular Biology gGmbH (IMB) is a centre of excellence in the life sciences that was established in 2011. Research at IMB concentrates on three cutting-edge areas: epigenetics, developmental biology, and DNA repair. The institute is a prime example of a successful collaboration between public authorities and a private foundation. The Boehringer Ingelheim Foundation has dedicated € 100 million for a period of 10 years to cover the operating costs for research at IMB, while the state of Rhineland-Palatinate provided approximately € 50 million for the construction of a state-of-the-art building. For more information about IMB please visit www.imb.de

About the Boehringer Ingelheim Foundation

The Boehringer Ingelheim Foundation is an independent, non-profit organisation committed to the promotion of the medical, biological, chemical, and pharmaceutical sciences. It was established in 1977 by Hubertus Liebrecht (1931-1991), a member of the shareholder family of the company Boehringer Ingelheim. Through its PLUS 3 Perspectives Programme and Exploration Grants, the foundation supports independent group leaders; it also endows the internationally renowned Heinrich Wieland Prize as well as awards for up-and-coming scientists. The foundation has granted € 100 million over a period of ten years to finance the scientific activities of the Institute of Molecular Biology (IMB).

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