



NEWS RELEASE

Institut Pasteur researchers use Malvern's triple detection chromatography system to characterise hydrodynamic changes in polypeptides

26 June 2009: Malvern, UK: Research carried out by scientists* from the Institut Pasteur in Paris, France, has shown that size exclusion chromatography followed by triple detection array (SEC-TDA) can distinguish between oligomerisation, hydration and shape changes of proteins. The work was conducted using advanced GPC/SEC systems from Viscotek, a Malvern company.

Using a Viscotek Triple Detector Array (TDA302) system coupled to a GPCmax chromatographic system, the team characterised the structural and hydrodynamic properties of a fragment of the adenylate cyclase (CyaA) toxin, a major virulence factor of *Bordetella pertussis*, the causative bacteria of whooping cough. The research team demonstrated that calcium binding induces important hydrodynamic changes in the protein, gaining important insights into its biological function. Results were published in the Journal of Biological Chemistry (Jan 2009; 284: 1781 – 1789).

Conventional calibration of size exclusion chromatography (SEC) is based on known hydrodynamic volume of standard proteins. Such a calibration procedure suffers from the drawback of possible interactions between the protein of interest and the SEC matrix. Hence, conventional calibration can provide neither the molecular mass nor reliable hydrodynamic information.

The Viscotek TDA302 uses a series of detectors to analyse the eluting sample, including: a UV-Visible spectrophotometer, a differential refractometer (RI), a 7° Low Angle Light Scattering (LALS), a 90° Right Angle Light Scattering (RALS) detector and a differential pressure (DP) Wheatstone bridge viscometer. OmniSEC software analyses all the collected data, presenting it in an information-rich format. The UV-detector and the RI are used to measure protein concentration, which is required to determine both the absolute molecular mass (MM) and the intrinsic viscosity (IV). MM is calculated directly from the light scattering data and IV from the viscometer. The IV results give insight into protein hydration and shape. In this application, IV is the only hydrodynamic parameter significantly affected by calcium binding. The information that the system supplies is therefore essential towards understanding protein binding and folding behaviours which can be key towards understanding how these molecules interact with the human body.

An application note based on this work can be freely downloaded at http://www.viscotek.com/Calcium-induced_hydrodynamic_changes

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*** The research team is composed of Alexandre Chenal, Bertrand Raynal, J. Iñaki Guijarro, Bruno Baron, Muriel Delepierre, Patrick England and Daniel Ladant. The team is located at Institut Pasteur, CNRS URA 2185, 28 rue du Dr. Roux, 75724 Paris cedex 15, France**

Image, notes and contact details to follow...

High resolution image attached or available from Trish Appleton, Kapler Communications trish@kapleronline.com Ref: MAL/JOB/1774

CAPTION: The Institut Pasteur, Paris, France



About the Institut Pasteur

The Institut Pasteur is one of the world's leading biomedical research centres. Founded by Louis Pasteur in 1887, it is a private, non-profit foundation dedicated to the prevention and treatment of diseases through biological research, education and public-health activities. Close to 2,600 people work on its campus in Paris, where a large part of its research activities are devoted to infectious diseases. The Paris institute is the heart of an International network bringing together 30 institutes across all five continents. Over a period of 120 years, 10 Institut Pasteur researchers have received the Nobel Prize, the latest of these in 2008, when it was awarded to Professors Françoise Barré-Sinoussi and Luc Montagnier for the discovery of the Aids virus.

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About Malvern Instruments

Malvern Instruments provides a range of complementary materials characterization tools that deliver inter-related measurements reflecting the complexities of particulates and disperse systems, nanomaterials and macromolecules. Analytical instruments from Malvern are used in the characterization of a wide variety of materials, from industrial bulk powders to nanomaterials and delicate macromolecules. A broad portfolio of innovative technologies is combined with intelligent, user-friendly software. These systems deliver industrially relevant data enabling our customers to make the connection between micro (such as particle size) and macro (bulk) material properties (rheology) and chemical composition (chemical imaging).

Particle size, particle shape, zeta potential, molecular weight, chemical composition and rheological properties measurements are now joined by advanced chromatography solutions (GPC/SEC), extending Malvern's technologies for protein molecular weight, size and aggregation measurements, and synthetic polymer molecular weight and distribution. The company's laboratory, at-line, on-line and in-line solutions are proven in sectors as diverse as cement production and pharmaceutical drug discovery.

Headquartered in Malvern, UK, Malvern Instruments has subsidiary organizations in all major European markets, North America, China, Korea and Japan, a joint venture in India, a global distributor network and applications laboratories around the world. www.malvern.com

Contact details to follow...

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