

Professor Mark Bradley

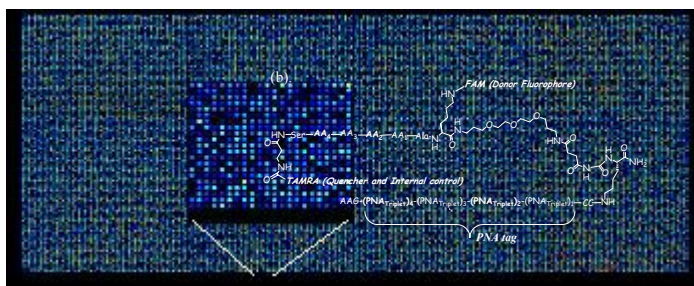
Professor of High-Throughput Chemical Biology

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Research Interests: Microarrays (cells, enzymatic assays, small molecules, and polymers); cellular delivery (DNA, proteins, peptides); high-throughput chemistry.

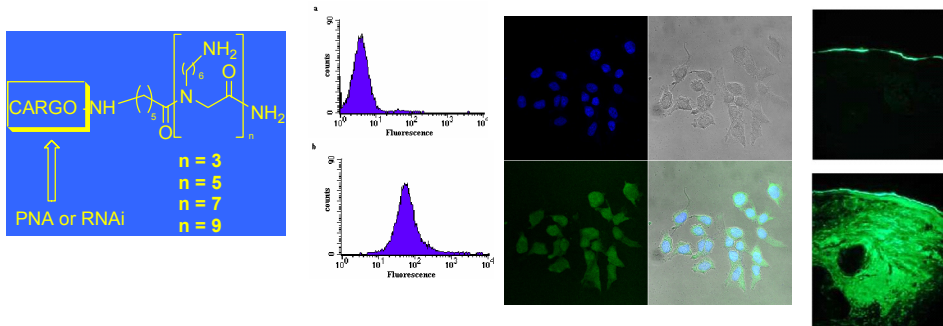


PNA encoded arrays: Our work in the array area originally began as a decoding method for PNA-encoded libraries, where each member of the library was “post-coded” by PNA to allow its “delivery” to a specific location on a DNA array/chip. The image below shows a screen of these 10,000 different substrates with an orphan protease, allowing rapid de-orphanisation of the protease in a single experiment (each spot represents a single known but different substrate). We now use arrays in a multitude of other arenas such as for controlling cell differentiation and global transfection.



A full 10,000 member library as used in the Bradley group for protease screening (note the 25,000 feature array has duplicates of all features to provide robust data sets and 5,000 control spots (insert)). (b). The structure of the 10,000 member split and mix library used for protease analysis.

Cellular delivery: The group has also developed chemical based delivery systems for both small molecule chemical based sensors and macromolecule delivery (PNA, DNA and proteins). Some of these cross the skin barrier and have uses in dermatological applications.



Structure of cellular delivery carrier system. (b). FACS analysis of Cells. (i) untreated cells, (ii) incubation of cells with peptoid (n = 7). (c). Nuclear targeting via a nuclear localisation sequence. (d). Delivery across human skin (top = control).

SELECTED RECENT PUBLICATIONS

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2. Microsphere Based Real-Time, In Situ Calcium Sensing, R.M. Sánchez-Martín, M. Cuttle, S. Mittoo, M. Bradley, *Angew Chemie*, **2006**, 5472-5474.
3. Captured and Cross-Linked Palladium Nanoparticles, J-K Cho, R. Najman, A. W. Dean, O Ichihara, C. Muller, M. Bradley, *J. Am. Chem. Soc.*, **2006**, 6276-6277.
4. High-throughput physical organic chemistry - Hammett parameter evaluation, C.F. Portal, M. Bradley, *Anal. Chem.*, **2006**, 78, 4931-4937.
5. Polymer microarrays: identification of substrates for phagocytosis assays, A. Mant, G. Tournaire, M. Bradley, *Biomaterials*, **2006**, 5299-5304.
6. Polymer microarrays for cellular adhesion, G. Tournaire, J. Collins, S. Campbell. H. Mizomoto, S. Ogawa, J.F. Thaburet, M. Bradley, *Chem. Commun.*, **2006**, 2118-2120.
7. Microarray platforms for enzymatic and cell-based assays, J.J. Diaz-Mochon, G. Tournaire, M. Bradley *Chem. Soc. Rev.*, 2007, 449-457.