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## Biography

Professor Mark Molloy's expertise is centred on the development and application of proteomic analyses for addressing problems in the life-sciences. His expertise in the use of mass spectrometry as the core analytical technique supports collaborative research in many science and biomedical areas, where he has a particularly strong focus towards translational cancer research. A major theme has been development of new mass spectrometry workflows for quantitative targeted proteomic analyses. This has enabled investigation of important questions such as the molecular characterisation of colon, thyroid and pancreatic cancers, melanomas and some lung cancers. The information has been used to identify prognostic and predictive protein biomarkers. More recently, he has opened a new research direction to use high resolution mass spectrometry for pharmacokinetic monitoring of cancer drug levels in cancer patients and is explore analysis from dried blood spots.

Mark's leadership and international standing in the application of proteomics is evidenced by outstanding grant success (career total \$42.9M), publications (>150), Scopus citations (>5,000) and HDR student completions (14). He was Director of the Australian Proteome Analysis Facility 2010-18 where his team provided expertise and world-class proteomic infrastructure to ~100 external academic and industry end-users each year.

Mark completed his PhD in proteomic sciences at Macquarie University under the supervision of Keith Williams before conducting post-doctoral research at the University of Michigan Medical School in Ann Arbor, USA. He then worked in the US pharmaceutical industry at Pfizer Inc for four years. He returned to Australia to carry out a National Health and Medical Research Council career development award fellowship on colorectal cancer (CRC) biomarker proteins before becoming Director of APAF.

He is an Honorary Professor in the Department of Molecular Sciences and Professor at The University of Sydney.

## Research output

### **Plasma glial fibrillary acidic protein in autosomal dominant Alzheimer's disease: associations with A $\beta$ -PET, neurodegeneration, and cognition**

Chatterjee, P., Vermunt, L., Gordon, B. A., Pedrini, S., Boonkamp, L., Armstrong, N. J., Xiong, C., Singh, A. K., Li, Y., Sohrabi, H. R., Taddei, K., Molloy, M., Benzinger, T. L. S., Morris, J. C., Karch, C., Berman, S., Chhatwal, J., Cruchaga, C., Graff-Radford, N. R., Day, G. S., & 19 others Farlow, M., Fox, N., Goate, A., Hassenstab, J., Lee, J. H., Levin, J., McDade, E., Mori, H., Perrin, R., Sanchez-Valle, R., Schofield, P. R., Levey, A., Jucker, M., Masters, C. L., Fagan, A. M., Bateman, R. J., Martins, R. N., Teunissen, C. & Dominantly Inherited Alzheimer Network, Jul 2023, In: *Alzheimer's and Dementia*. 19, 7, p. 2790-2804 15 p.

### **Head-to-head comparison of plasma biomarkers across the AD continuum in an Australian population**

Chatterjee, P., Pedrini, S., Doecke, J. D., Thota, R. N., Villemagne, V. L., Dore, V., Singh, A. K., Wang, P., Rainey-Smith, S., Fowler, C. J., Taddei, K., Sohrabi, H. R., Molloy, M. P., Ames, D., Maruff, P., Rowe, C. C., Masters, C. L., Martins, R. N. & The AIBL Research Group, Jun 2023, In: *Alzheimer's and Dementia*. 19, S2, p. 1-3 3 p., e065323.

### **Plasma A $\beta$ 42/40 ratio, p-tau181, GFAP and NFL across the Alzheimer's disease continuum: a cross-sectional and longitudinal study in the AIBL cohort**

Chatterjee, P., Pedrini, S., Doecke, J. D., Thota, R., Villemagne, V. L., Dore, V., Singh, A. K., Wang, P., Rainey-Smith, S., Fowler, C., Taddei, K., Sohrabi, H. R., Molloy, M. P., Ames, D., Maruff, P., Rowe, C. C., Masters, C. L., Martins, R. N. & The AIBL Research Group, Apr 2023, In: *Alzheimer's and Dementia*. 19, 4, p. 1117-1134 18 p.

### **Integrative omics identifies conserved and pathogen-specific responses of sepsis-causing bacteria**

Mu, A., Klare, W. P., Baines, S. L., Ignatius Pang, C. N., Guérillot, R., Harbison-Price, N., Keller, N., Wilksch, J., Nhu, N. T. K., Phan, M.-D., Keller, B., Nijagal, B., Tull, D., Dayalan, S., Chua, H. H. C., Skoneczny, D., Koval, J., Hachani, A., Shah, A. D., Neha, N., & 71 others Jadhav, S., Partridge, S. R., Cork, A. J., Peters, K., Bertolla, O., Brouwer, S., Hancock, S. J., Álvarez-Fraga, L., De Oliveira, D. M. P., Forde, B., Dale, A., Mujchariyakul, W., Walsh, C. J., Monk, I., Fitzgerald, A., Lum, M., Correa-Ospina, C., Roy Chowdhury, P., Parton, R. G., De Voss, J., Beckett, J., Monty, F., McKinnon, J., Song, X., Stephen, J. R., Everest, M., Bellgard, M. I., Tinning, M., Leeming, M., Hocking, D., Jebeli, L., Wang, N., Ben Zakour, N., Yasar, S. A., Vecchiarelli, S., Russell, T., Zaw, T., Chen, T., Teng, D., Kassir, Z., Lithgow, T., Jenney, A., Cole, J. N.,

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**One step forward with dry surface biofilm (DSB) of *Staphylococcus aureus*: TMT-based quantitative proteomic analysis reveals proteomic shifts between DSB and hydrated biofilm**

Rahman, M. A., Amirkhani, A., Parvin, F., Chowdhury, D., Molloy, M. P., Deva, A. K., Vickery, K. & Hu, H., 13 Oct 2022, In: International Journal of Molecular Sciences. 23, 20, p. 1-17 17 p., 12238.

**Plasma glial fibrillary acidic protein in autosomal dominant Alzheimer's disease: associations with  $\beta$ -amyloid-PET, neurodegeneration and cognition**

Chatterjee, P., Vermunt, L., Gordon, B., Pedrini, S., Boonkamp, L., Armstrong, N., Xiong, C., Singh, A., Li, Y., Sohrabi, H., Taddei, K., Molloy, M., Benzinger, T., Morris, J., Karch, C., Berman, S., Chhatwal, J., Cruchaga, C., Graff-Radford, N., Day, G., & 18 others Farlow, M., Fox, N., Goate, A., Hassenstab, J., Lee, J.-H., Levin, J., McDade, E., Mori, H., Perrin, R., Sánchez-Valle, R., Schofield, P., Levey, A., Jucker, M., Masters, C., Fagan, A., Bateman, R., Martins, R. & Teunissen, C., 7 Jul 2022, (Submitted).

**Proteome of *Staphylococcus aureus* biofilm changes significantly with aging**

Rahman, M. A., Amirkhani, A., Chowdhury, D., Mempin, M., Molloy, M. P., Deva, A. K., Vickery, K. & Hu, H., 8 Jun 2022, In: International Journal of Molecular Sciences. 23, 12, p. 1-16 16 p., 6415.

**SERS characterization of colorectal cancer cell surface markers upon anti-EGFR treatment**

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Proteomic analysis of whole blood using volumetric absorptive microsampling for precision medicine biomarker studies

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**Overlapping genes in natural and engineered genomes**

Wright, B. W., Molloy, M. P. & Jaschke, P. R., Mar 2022, In: Nature Reviews Genetics. 23, 3, p. 154-168 15 p.

**Highly specific detection of KRAS single nucleotide polymorphism by asymmetric PCR/SERS assay**

Lyu, N., Rajendran, V. K., Li, J., Engel, A., Molloy, M. P. & Wang, Y., 21 Sept 2021, In: The Analyst. 146, 18, p. 5714-5721 8 p.

**ALS/FTD-causing mutation in cyclin F causes the dysregulation of SFPQ**

Rayner, S. L., Cheng, F., Hogan, A. L., Grima, N., Yang, S., Ke, Y. D., Au, C. G., Morsch, M., De Luca, A., Davidson, J. M., Molloy, M. P., Shi, B., Ittner, L. M., Blair, I., Chung, R. S. & Lee, A., 1 Jun 2021, In: Human Molecular Genetics. 30, 11, p. 971-984 14 p.

**Proteome analysis of human adipocytes identifies depot-specific heterogeneity at metabolic control points**

Raajendiran, A., Krisp, C., De Souza, D. P., Ooi, G., Burton, P. R., Taylor, R. A., Molloy, M. P. & Watt, M. J., Jun 2021, In: American journal of physiology - endocrinology and metabolism. 320, 6, p. E1068-E1084 17 p.

**Identification of a novel ciprofloxacin tolerance gene, *aciT*, which contributes to filamentation in *Acinetobacter baumannii***

Naidu, V., Shah, B., Kamath, K. S., Chien, A., Nagy, S., Pokhrel, A., Molloy, M., Hassan, K. A. & Paulsen, I. T., May 2021, In: Antimicrobial Agents and Chemotherapy. 65, 6, p. 1-9 9 p., e01400.

**Proteomic and transcriptomic analysis of *Microviridae*  $\phi$ X174 infection reveals broad upregulation of host *Escherichia coli* membrane damage and heat shock responses**

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**Inhibitor of Differentiation 4 (ID4) represses mammary myoepithelial differentiation via inhibition of HEB**

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**Presymptomatic Dutch-type hereditary cerebral amyloid angiopathy related blood metabolite alterations**

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**Quantitative proteomic profiling of small molecule treated mesenchymal stem cells using chemical probes**

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Differential regulation of extracellular matrix proteins in three recurrent liver metastases of a single patient with colorectal cancer

Voß, H., Wurlitzer, M., Smit, D. J., Ewald, F., Alawi, M., Spohn, M., Indenbirken, D., Omid, M., David, K., Juhl, H., Simon, R., Sauter, G., Fischer, L., Izbicki, J. R., Molloy, M. P., Nashan, B., Schlüter, H. & Jücker, M., Dec 2020, In: *Clinical and Experimental Metastasis*. 37, 6, p. 649-656 8 p.

**Genome modularization reveals overlapped gene topology is necessary for efficient viral reproduction**

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**PSMD11, PTPRM and PTPRB as novel biomarkers of pancreatic cancer progression**

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**Evaluating bioanalytical capabilities of paper spray ionization for abiraterone drug quantification in patient plasma**

Bhatnagar, A., McKay, M. J., Arasaratnam, M., Crumbaker, M., Gurney, H. & Molloy, M. P., Oct 2020, In: *Journal of Mass Spectrometry*. 55, 10, p. 1-8 8 p., e4584.

**Changes in dietary fiber intake in mice reveal associations between colonic mucin O-glycosylation and specific gut bacteria**

Gamage, H. K. A. H., Chong, R. W. W., Bucio-Noble, D., Kautto, L., Hardikar, A. A., Ball, M. S., Molloy, M. P., Packer, N. H. & Paulsen, I. T., 29 Sept 2020, In: *Gut Microbes*. 12, 1, p. 1-15 15 p., e1802209.

**Multiplex detection of ctDNA mutations in plasma of colorectal cancer patients by PCR/SERS assay**

Lyu, N., Rajendran, V. K., Diefenbach, R. J., Charles, K., Clarke, S. J., Engel, A., Sydney 1000 Colorectal Cancer Study Investigators, Rizos, H., Molloy, M. & Wang, Y., 25 Aug 2020, In: *Nanotheranostics*. 4, 4, p. 224-232 9 p.

**Proteogenomic analysis of Inhibitor of Differentiation 4 (ID4) in basal-like breast cancer**

Baker, L. A., Holliday, H., Roden, D., Krisp, C., Wu, S. Z., Junankar, S., Serandour, A. A., Mohammed, H., Nair, R., Sankaranarayanan, G., Law, A. M. K., McFarland, A., Simpson, P. T., Lakhani, S., Dodson, E., Selinger, C., Anderson, L., Samimi, G., Hacker, N. F., Lim, E., & 10 othersOrmandy, C. J., Naylor, M. J., Simpson, K., Nikolic, I., O'Toole, S., Kaplan, W., Cowley, M. J., Carroll, J. S., Molloy, M. & Swarbrick, A., 11 Jun 2020, In: *Breast cancer research : BCR*. 22, p. 1-18 18 p., 63.

**BioID analysis of the cyclin F interactome reveals that ALS-variant cyclin F alters the homeostasis of paraspeckle-associated proteins**

Rayner, S. L., Cheng, F., Yang, S., Grima, N., Ke, Y. D., Au, C. G., Morsch, M., Luca, A. D., Davidson, J. M., Molloy, M. P., Shi, B., Ittner, L. M., Blair, I., Chung, R. S. & Lee, A., 1 May 2020, (In preparation) In: *bioRxiv*.

**PGRMC1 phosphorylation affects cell shape, motility, glycolysis, mitochondrial form and function, and tumor growth**

Thejear, B. M., Adhikary, P. P., Kaur, A., Teakel, S. L., Van Oosterum, A., Seth, I., Pajic, M., Hannan, K. M., Pavy, M., Poh, P., Jazayeri, J. A., Zaw, T., Pascovici, D., Ludescher, M., Pawlak, M., Cassano, J. C., Turnbull, L., Jazayeri, M., James, A. C., Coorey, C. P., & 11 others Roberts, T. L., Kinder, S. J., Hannan, R. D., Patrick, E., Molloy, M. P., New, E. J., Fehm, T. N., Neubauer, H., Goldys, E. M., Weston, L. A. & Cahill, M. A., 3 Apr 2020, In: BMC Molecular and Cell Biology. 21, p. 1-24 24 p., 24.

**The prognostic role of inflammatory markers in patients with metastatic colorectal cancer treated with bevacizumab: a translational study [ASCENT]**

Clarke, S., Burge, M., Feeney, K., Gibbs, P., Jones, K., Marx, G., Molloy, M. P., Price, T., Reece, W. H. H., Segelov, E. & Tebbutt, N. C., 6 Mar 2020, In: PLoS ONE. 15, 3, p. 1-11 11 p., e0229900.

**Identification of novel biomarkers in pancreatic tumor tissue to predict response to neoadjuvant chemotherapy**

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**Omixlitminer: a bioinformatics tool for prioritizing biological leads from 'omics data using literature retrieval and data mining**

Steffen, P., Wu, J., Hariharan, S., Voss, H., Raghunath, V., Molloy, M. P. & Schlüter, H., Feb 2020, In: International Journal of Molecular Sciences. 21, 4, p. 1-11 11 p., 1374.

**ELF5 modulates the estrogen receptor cistrome in breast cancer**

Piggin, C. L., Roden, D. L., Law, A. M. K., Molloy, M. P., Krisp, C., Swarbrick, A., Naylor, M. J., Kalyuga, M., Kaplan, W., Oakes, S. R., Gallego-Ortega, D., Clark, S. J., Carroll, J. S., Bartonicek, N. & Ormandy, C. J., 2 Jan 2020, In: PLoS Genetics. 16, 1, p. 1-24 24 p., e1008531.

**Radiation-stimulated translocation of CD166 and CRYAB to the endothelial surface provides potential vascular targets on irradiated brain arteriovenous malformations**

McRobb, L. S., McKay, M. J., Gauden, A. J., Lee, V. S., Subramanian, S., Thomas, S. G., Wiedmann, M. K. H., Moutrie, V., Grace, M., Zhao, Z., Molloy, M. P. & Stoodley, M. A., Dec 2019, In: International Journal of Molecular Sciences. 20, 23, p. 1-13 13 p., 5830.

**Protein paucimannosylation is an enriched N-glycosylation signature of human cancers**

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**Bioanalytical evaluation of dried plasma spots for monitoring of abiraterone and  $\Delta(4)$ -abiraterone from cancer patients**

Bhatnagar, A., McKay, M. J., Thaysen-Andersen, M., Arasaratnam, M., Crumbaker, M., Gurney, H. & Molloy, M. P., 15 Sept 2019, In: Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences. 1126-1127, p. 1-9 9 p., 121741.

**Proteomic screen with the proto-oncogene beta-catenin identifies interaction with Golgi coatomer complex I**

Semaan, C., Henderson, B. R. & Molloy, M. P., Sept 2019, In: Biochemistry and Biophysics Reports. 19, p. 1-6 6 p., 100662.

**Inter- and intra-patient variability in pharmacokinetics of abiraterone acetate in metastatic prostate cancer**

Arasaratnam, M., Crumbaker, M., Bhatnagar, A., McKay, M. J., Molloy, M. P. & Gurney, H., Jul 2019, In: Cancer Chemotherapy and Pharmacology. 84, 1, p. 139-146 8 p.

**Using proteomics to identify ubiquitin ligase-substrate pairs: how novel methods may unveil therapeutic targets for neurodegenerative diseases**

Rayner, S. L., Morsch, M., Molloy, M. P., Shi, B., Chung, R. & Lee, A., Jul 2019, In: Cellular and Molecular Life Sciences. 76, 13, p. 2499-2510 12 p.

**Proteome profiling of *Pseudomonas aeruginosa* PAO1 identifies novel responders to copper stress**

Wright, B. W., Kamath, K. S., Krisp, C. & Molloy, M. P., 1 Apr 2019, In: *BMC Microbiology*. 19, p. 1-13 13 p., 69.

**Pathogenic mutation in the ALS/FTD gene, *CCNF*, causes elevated Lys48-linked ubiquitylation and defective autophagy.**

Lee, A., Rayner, S. L., Gwee, S. S. L., De Luca, A., Shahheydari, H., Sundaramoorthy, V., Morsch, M., Hogan, A., Don, E., Williams, K., Yerbury, J. J., Blair, I., Atkin, J. D., Molloy, M. P. & Chung, R. S., 8 Feb 2019. 1 p.

**iSwathX: an interactive web-based application for extension of DIA peptide reference libraries**

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**An integrative "omics" approach, for identification of bona fides PLK1 associated biomarker in esophageal adenocarcinoma**

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**Examining cellular responses to kinase drug inhibition through phosphoproteome mapping of substrates**

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**Targeted mass spectrometry of S100 proteins**

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**Vascular targeting of an atypical surface translocated  $\alpha$ B-crystallin for the treatment of irradiated brain arteriovenous malformations.**

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**Proteomics identification of radiation-induced changes of membrane proteins in the rat model of arteriovenous malformation in pursuit of targets for brain AVM molecular therapy**

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**Pharmacological inhibition of casein kinase 2 enhances the effectiveness of PI3K inhibition in colon cancer cells**

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**Proteomic profile of sex-sorted bull sperm evaluated by SWATH-MS analysis**

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**Proteomic phenotyping of metastatic melanoma reveals putative signatures of MEK inhibitor response and prognosis**

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**Fiber supplements derived from sugarcane stem, wheat dextrin and psyllium husk have different in vitro effects on the human gut microbiota**

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**Alternative assembly of respiratory complex II connects energy stress to metabolic checkpoints**

Bezawork-Geleta, A., Wen, H., Dong, L., Yan, B., Vider, J., Boukalova, S., Krobova, L., Vanova, K., Zobalova, R., Sobol, M., Hozak, P., Novais, S. M., Caisova, V., Abaffy, P., Naraine, R., Pang, Y., Zaw, T., Zhang, P., Sindelka, R., Kubista, M., & 7 othersZuryn, S., Molloy, M. P., Berridge, M. V., Pacak, K., Rohlena, J., Park, S. & Neuzil, J., 7 Jun 2018, In: Nature Communications. 9, p. 1-17 17 p., 2221.

**Quantitation of the anticancer drug abiraterone and its metabolite  $\Delta(4)$ -abiraterone in human plasma using high-resolution mass spectrometry**

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**Multi-laboratory analysis of the variability of shipped samples for proteomics following non-cooled international transport**

Steffen, P., Krisp, C., Yi, W., Yang, P., Molloy, M. P. & Schlüter, H., 1 May 2018, In: Analytical Biochemistry. 548, p. 60-65 6 p.

**Polyphenol extracts from dried sugarcane inhibit inflammatory mediators in an in vitro colon cancer model**

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**Development of a data independent acquisition mass spectrometry workflow to enable glycopeptide analysis without predefined glycan compositional knowledge**

Lin, C-H., Krisp, C., Packer, N. H. & Molloy, M. P., 10 Feb 2018, In: Journal of Proteomics. 172, p. 68-75 8 p.

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