

## New System Unmasks Rare Proteins in Crowded Human Plasma

Removing ~60 common proteins lets scientists see less abundant disease markers

Using liquid chromatography, mass spectrometry, and other instruments at the Department of Energy's EMSL, scientists from Pacific Northwest National Laboratory, EMSL, and GenWay Biotech, Inc. designed a new protein separations system—the tandem IgY12-SuperMix—that enhances the detection of hard-to-find proteins in human plasma. Using this new approach with the proteomics technologies developed at PNNL, the scientists removed the ~60 most abundant proteins from plasma samples. With these proteins removed, the scientists detected numerous low-abundance proteins. This technology makes the discovery of low-abundance disease biomarkers more feasible. The team is developing methodologies to detect breast cancer and other disease state biomarkers.

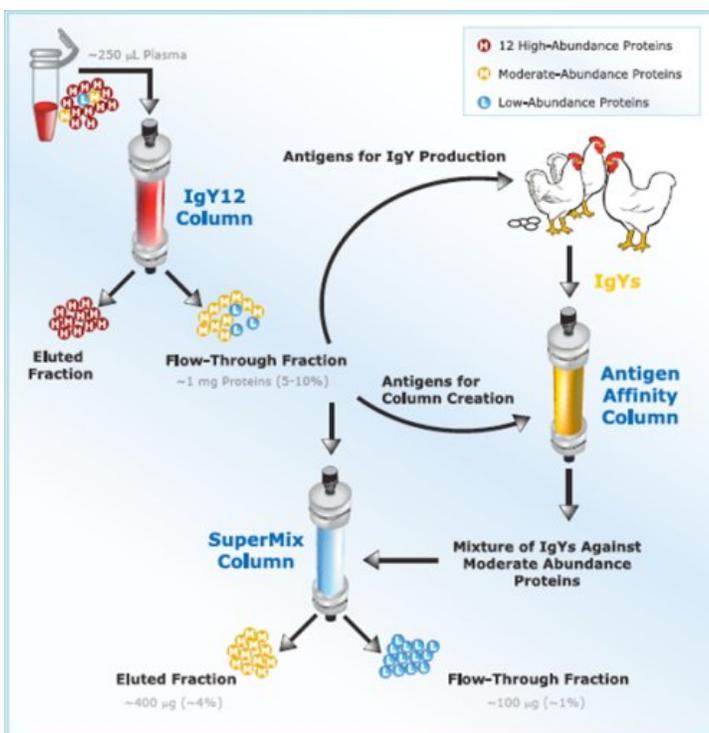
**Scientific impact:** The tandem IgY12-SuperMix allows scientists to detect cytokines and other molecules of interest at the low nanogram-per-milliliter to sub-nanogram-per-milliliter range in the presence of other proteins that are more than 8 orders of magnitude higher in abundance. This work is part of EMSL's ongoing efforts to predict biological functions from molecular and chemical data.

**Societal impact:** The more sensitive technology will accelerate the discovery of novel biomarkers for improved diagnosis and prognosis of human diseases such as cancer, which will, in turn, impact the biomedical practice and human health.

For more information, contact EMSL Communications Manager Mary Ann Showalter (509-371-6017).

**Reference:** Qian W, DT Kaleta, BO Petritis, H Jiang, T Liu, X Zhang, HM Mottaz, SM Varnum, DG Camp II, L Huang, X Fang, W Zhang, and RD Smith. 2008. "Enhanced detection of low-abundant human plasma proteins using a tandem IgY12-SuperMix immunoaffinity separation strategy." *Molecular & Cellular Proteomics*. MCP 7(10):1963-1973.

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The tandem IgY12-SuperMix immunoaffinity separation strategy was developed by GenWay Biotech, EMSL, and PNNL. Typical recoveries are indicated assuming ~250 µl of plasma is loaded.