

New biosensors from the blood of llamas

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An unusual protein found in the blood of llamas has enabled scientists to develop a quick, simple method for making antibodies that could be used in a new generation of biosensors. The biosensors could detect deliberate environmental contamination with a wide range of disease-causing microbes and toxins, with new sensors produced quickly in response to newly emerging biothreats, researchers said.

The U. S. Naval Research Laboratory's Ellen R. Goldman and Andrew Hayhurst, of the Southwest Foundation for Biomedical Research, describe their research in a report scheduled for the Dec. 1 issue of the ACS's *Analytical Chemistry*, a semi-monthly journal. Llamas, they point out, are among certain animals (camels and sharks being the others) that produce heavy chain antibodies, from which so-called single domain antibodies (sdAbs) can be isolated by genetic engineering.

These antibodies are tougher and more durable than the antibodies now used in medical tests and biosensors. Single domain antibodies do not need refrigeration, for instance, and can withstand temperatures of almost 200 degrees Fahrenheit.

The researchers describe producing sdAbs to a smallpox virus surrogate, cholera toxin, and other biothreats by harvesting antibodies from a library of over a billion different sdAbs engineered in the laboratory, which bypasses the need for injecting llamas with those substances. "The delivery speed and the sdAb protein characteristics of small size, ruggedness, and ability to be engineered for optimal orientation and patterning means that sdAbs are likely to be high-performance yet low-

maintenance substitutes for any antibody-based biosensor," the report states.

Source: American Chemical Society

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