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Clotting Cells Switched On By Cold

Mar. 20, 2002 — Platelets, the cells that make blood clot, are in high demand from blood banks. Blood banks store them at room temperature and throw them out after five days. They would last longer refrigerated, but if you chill platelets, they activate and form a useless clot in the bag. Researchers have now shown that a key step for that activation is the formation of "lipid raft" structures in the membranes enclosing the cells.

Discovering how and why platelets get activated is also important for understanding how blood clots can cause heart attacks and strokes.

Karine Gousset and colleagues from the University of California, Davis, Biostabilization Laboratory, led by John Crowe and Fern Tablin, have shown that chilling causes changes in the platelets' outer membrane. At body temperature, cell membranes are fairly fluid, like a soap bubble. The fatty molecules that make up the membrane can jostle and move around next to each other.

When the temperature drops, some of the molecules in the membrane, such as cholesterol and another molecule called sphingomyelin, clump into distinct islands in the membrane called "lipid rafts." Some proteins attached to the surface, including some that carry signals from the cell surface to the inside, are also collected into these rafts.

After rafts form, the cells show other signs of activation, such as increased calcium levels, Crowe said. Platelets respond to other signals in the same way, showing that lipid raft formation is a general first step in platelet activation, Crowe said.
