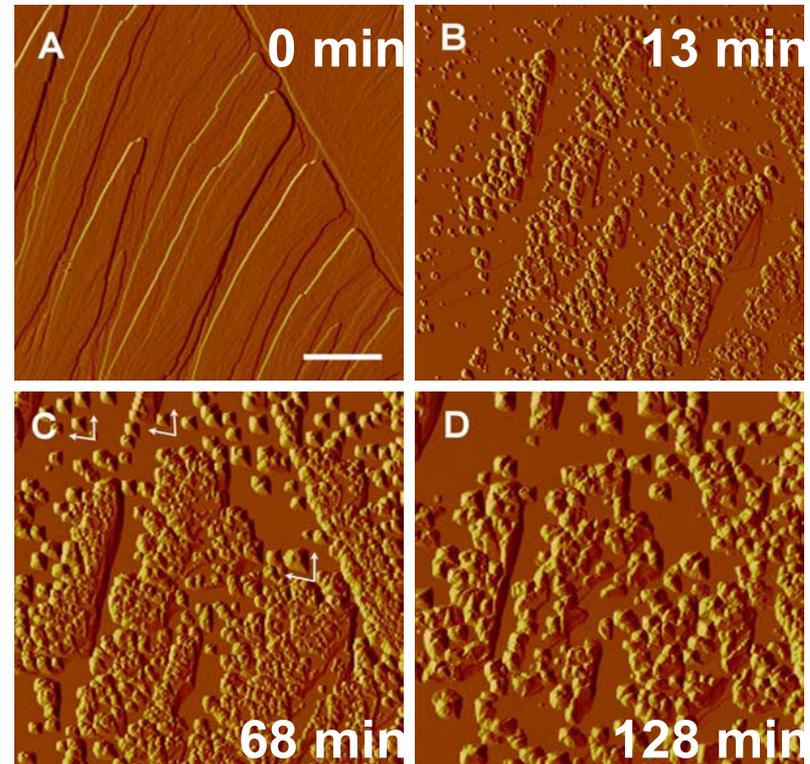


An *In Situ* AFM Investigation of Cholesterol Crystal Growth

Jennifer Swift, Georgetown University, DMR 0093069

The crystallization of cholesterol crystals in biological systems is associated with the unwelcome formation of **gallstones** and **arterial plaques**. Cholesterol deposits are often found to coexist with calcium-containing minerals, suggesting that one material might act as a viable “seed” for the nucleation and growth of the other.

A series of geometric calculations were performed, which identified many good geometric matches between cholesterol and mineral surfaces. The best calculated match was tested experimentally with in situ AFM. When an otherwise stable model bile solution is flowed over the (104) surface of calcite, sequential AFM images illustrate the rapid formation of oriented cholesterol islands on the calcite surface. This work illustrates one pathway in which cholesterol deposition might occur in vivo.



Scale bar = 2 μ m

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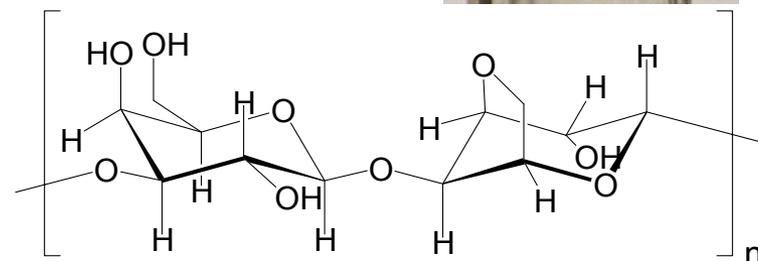
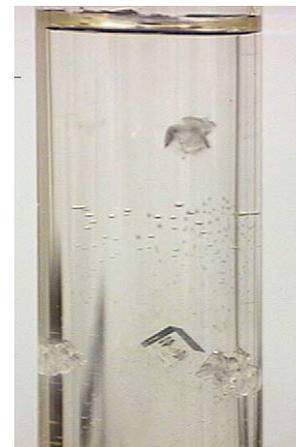
Education:

Two graduate students (R.S. Abendan and M.C. Frincu) and four undergraduates (M.Hamso, R.E. Sharpe, A.R. Pogozelski and J.A. Basile) contributed to this work.

At the Aug 2004 ACS national meeting, Abendan was awarded a “*Best Poster Prize*” from the division on Colloids & Surfaces. Frincu also received a “*CrystEngComm Best Poster Prize*” for her presentation at an international EURESCO conference in May 2003. Frincu is currently completing a 3-month Science Policy Fellowship sponsored by the National Academies of Science.

Laboratory Redesign:

Swift was acknowledged as one of eight University-wide Teaching, Learning and Technology Fellows, for her efforts to redesign the undergraduate organic laboratory format. Several new modules were introduced, including one focusing on crystal growth inside gels.



Agarose (derived from seaweed)