Do lipids or proteins in plasma reduce bubble surface tension? The interrelationships between plasma lipid and proteins, surface tension and post-dive venous gas embolism.

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Theory & modeling
Triglycerides (TriG) and cholesterol (Ch) have inappropriate 3-D structure for micelle formation and are insoluble. Phospholipids cannot form spontaneously micelles. Molecular dissolved FFA (long chain; only nM range!) could just cover all bubbles (irrespective BG grade), but
1. takes many hours and
2. the long-chain-FFA critical micelle concentration is in mM range!
Albumin (Alb) can cover all bubbles 10^7 times.

Hypothesis
None of the lipids act as surfactant

Methods
Correlate post exposure albumin, total protein, Alb, triglycerides TriG, total Ch, molecular dissolved fatty acids FFAs, with VGB (KISS at 40, 80, 120, 160 post-dive, precordial) and with γ.

Main Findings
• No significant and consistent effects of lipids and proteins on surface tension ST pre- and post exposure.
• Lipids and proteins do not affect KISS.
• KISS does not correlate with γ.
• γ ca. 57 mN/m (corrected)

Discussion
Likely, the 15 mN/m decrease (rel water) is caused by proteins, surrounding the bubbles. Albumin is in access: can cover all KM=4 bubbles in 10,000 fold!

Conclusions
1 Most likely, dive bubbles have NO lipid surfactant.
2 Probably bubbles have an albumin coating; small lowering of γ and hardly stabilizing.