Purification of IgA antibodies and Fc-fusion proteins with conjugated: *Engineered-micelles*

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We introduce a new concept and a potentially general platform for purification of IgA antibodies that does not rely on chromatography nor specific ligands; rather, makes use of detergent aggregates capable of efficiently capturing IgA's while rejecting hydrophilic impurities. Purification is performed at close to neutrality (pH 6.5-7) thereby avoiding exposure of IgA's to harsh acidic conditions. IgA's are recovered in good yields (>81-91%, by densitometry), high purity (>95%, by SDS-PAGE), preserve their secondary structure (by circular dichroism, CD) and do not aggregate (by dynamic ligand scattering, DLS). The aggregates studied consist of conjugated "*Engineered-micelles*" built from nonionic detergents (*e.g.*, Tween or Brij), the hydrophobic chelator, bathophenanthroline and Fe^{2+} ions. Process upscaling (x50) is not affecting yield or purity of the recovered IgA's and requires only proportional increase of all reagents. Since very similar findings are found with Fc-fusion proteins as well, we shall discuss the possible integration of this purification platform within industrial-scale downstream processing of therapeutic antibodies and Fc-fusion proteins.