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JOURNAL ARTICLE

A fragment of prosaposin (SGP-1) from rooster sperm promotes sperm-egg binding and improves fertility in chickens

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A protein isolated from the supernatant of cryopreserved rooster sperm was found to increase the capability of cryopreserved rooster sperm to bind in vitro to the perivitelline membrane of a chicken egg and substantially raise fertility after artificial insemination (AI). That activity was partially purified and termed universal primary sperm-egg binding protein (UPSEBP). Insufficient protein remained from 6×10^{11} sperm, despite retention of bioactivity, to allow sequencing. We deduced that the protein may be related to prosaposin (also termed SGP-1, for sulfated glycoprotein-1), and we used published amino acid sequences of prosaposin as a guide for synthesis of peptides. Certain peptides were found to increase in vitro sperm-egg binding and increase fertility of frozen-thawed or fresh rooster sperm, in a manner similar to semipurified UPSEBP. Active epitopes were in a 60 amino acid sequence, reflecting the intervening sequence between saposins A and B, plus short extensions into saposins A and B. Highest activity was found when this synthetic peptide was oxidized to form a disulfide bond between terminal cysteines. Antibody against a synthetic peptide consisting of 58 of these 60 amino acids bound to a 7-9 kilodalton protein in UPSEBP. Collectively, the data support the conclusion that UPSEBP is a fragment of prosaposin. Because prosaposin is in semen in humans and animals, these observations have broad implications for possible cause and therapy of one type of subfertility.

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