

A new type of surgical adhesive made from porcine collagen and polyglutamic acid.

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Abstract:

We have developed a new adhesive for surgical use. The new adhesive is made of three components: porcine collagen, poly(L-glutamic acid) and water-soluble carbodiimides (WSC). The optimum concentration of each component was determined by measuring the time required for gel formation in experiments in vitro. Using these optimum concentrations, we applied the adhesive to wounds made on rats. A conventional fibrin glue was used as a control. Measurement of tensile strength and histological examination were performed 5, 7, 10, and 14 days after the operation. The tensile strength of wounds treated with 2.5 mg/mL collagen glue was not significantly different from that of wounds treated with fibrin glue except at 7 days after the operation ($p < 0.05$ by Student's t-test). Histological examination revealed that the speed of cell infiltration into, and absorption of 2.5 mg/mL collagen glue was slower than for fibrin glue, but faster than for 5.0 mg/mL collagen glue. One of the important advantages of our collagen glue is that the absorption rate of it can be controlled by the collagen concentration. Therefore, it seems to be adequate for sealing air leakage from the lung, which takes a relatively long period for recovery. Moreover it does not contain human serum, and, hence, it requires no blood donation and can be obtained with low cost. (C) 2000 John Wiley and Sons, Inc.