

CONTROLLED RELEASE OF MEDICAMENTS USING POLYMERS FROM GLYCOLIC ACID

CROSS REFERENCES

This application is a continuation-in-part of Ser. No. 365,656, filed May 31, 1973, now U.S. Pat. No. 3,875,937, dated Apr. 8, 1975, SURGICAL DRESSINGS OF ABSORBABLE POLYMERS, which is a continuation-in-part of Ser. No. 157,521, filed June 28, 1971, now U.S. Pat. No. 3,739,773, June 19, 1973, POLYGLYCOLIC ACID PROSTHETIC DEVICES, which is a continuation-in-part of Ser. No. 852,617, Aug. 25, 1969, now U.S. Pat. No. 3,620,218, Nov. 16, 1971, CYLINDRICAL PROSTHETIC DEVICES OF POLYGLYCOLIC ACID, which is a continuation-in-part of Ser. No. 608,086, Jan. 9, 1967, now U.S. Pat. No. 3,463,158, Aug. 26, 1969, POLYGLYCOLIC ACID PROSTHETIC DEVICES which is a continuation-in-part of Ser. No. 320,543, filed Oct. 31, 1963, now U.S. Pat. No. 3,297,033, Jan. 10, 1967, SURGICAL SUTURES. Reference is made to said earlier patents for certain prior art and definitions there set forth.

Related data incorporated herein by this reference on manufacturing of polyglycolic acid, producing surgical elements thereof and its use for surgical purposes, additional prior art and definitions, are disclosed in:

U.S. Pat. No. 3,414,939 — Dec. 10, 1968, Chirgwin, APPARATUS FOR QUENCHING MELT-SPUN FIBERS.

U.S. 3,422,181 — Jan. 14, 1969, Chirgwin, METHOD FOR HEAT SETTING OF STRETCH ORIENTED POLYGLYCOLIC ACID FILAMENT.

U.S. Pat. No. 3,435,008 — March 25, 1969, Schmitt, Epstein, and Polistina, METHOD FOR PREPARATION OF ISOMERICALLY PURE β -GLYCOLIDE AND POLYMERIZATION METHOD FOR GLYCOLIDE COMPOSITIONS AND POLYMERIZATION METHOD FOR GLYCOLIDE COMPOSITIONS EMPLOYING PARTIAL HYDROLYZATE OF SAID β -GLYCOLIDE.

U.S. Pat. No. 3,442,871 — May 6, 1969, Schmitt, Epstein and Polistina, PROCESS FOR POLYMERIZING A GLYCOLIDE.

U.S. 3,457,280 — July 22, 1969, Schmitt, Epstein and Polistina, α -GLYCOLIDE AND METHODS FOR THE ISOLATION THEREOF.

U.S. Pat. No. 3,468,853 — Sept. 23, 1969, Schmitt and Polistina, PROCESS OF POLYMERIZING A GLYCOLIDE.

U.S. Pat. No. 3,565,077 — Feb. 23, 1971, Glick, DENSIFIED ABSORBABLE POLYGLYCOLIC ACID SUTURE BRAID, AND METHOD FOR PREPARING SAME.

U.S. Pat. No. 3,565,869 — Feb. 23, 1971, DeProspero, EXTRUDABLE AND STRETCHABLE POLYGLYCOLIC ACID AND PROCESS FOR PREPARING SAME.

U.S. Pat. No. 3,597,449 — Aug. 3, 1971, DeProspero and Schmitt, STABLE GLYCOLIDE AND LACTIDE COMPOSITIONS.

U.S. Pat. No. 3,597,450 — Aug. 3, 1971, Schmitt, Polistina, Epstein and DeProspero, PREPARATION OF GLYCOLIDE POLYMERIZABLE INTO POLYGLYCOLIC ACID OF CONSISTENTLY HIGH MOLECULAR WEIGHT.

U.S. Pat. No. 3,600,223, — Aug. 17, 1971, Glick and McCusker, PROCESS FOR CLEANING POLYGLYCOLIC ACID FILAMENTS USEFUL AS ABSORBABLE SURGICAL SUTURES.

U.S. Pat. No. 3,626,948, — Dec. 14, 1971, Glick and McPherson, ABSORBABLE POLYGLYCOLIC ACID SUTURE OF ENHANCED IN-VIVO STRENGTH RETENTION.

U.S. Pat. No. 3,728,739 — Apr. 24, 1973, Semp, STERILE SURGICAL GLOVES.

U.S. Pat. No. 3,728,839 — Apr. 24, 1973, Glick, STORAGE STABLE SURGICALLY ABSORBABLE POLYGLYCOLIC ACID PRODUCTS.

U.S. Ser. No. 118,974, Feb. 25, 1971, Ramsey and Delapp, PREPARATION OF POLYGLYCOLIC ACID IN FINELY DIVIDED FORM, now U.S. Pat. No. 3,781,349, Dec. 25, 1973.

U.S. Ser. No. 171,320, Aug. 12, 1971, Schmitt and Bailey, POLYGLYCOLIC ACID IN SOLUTIONS, now U.S. Pat. 3,737,440, June 5, 1973.

U.S. Ser. No. 176,291, Aug. 30, 1971, Glick and Chirgwin, DOPE-DYED POLYGLYCOLIC ACID SUTURES.

U.S. Ser. No. 190,290, Oct. 18, 1971, Schmitt and Epstein, COPOLYMERS ABSORBABLE BY LIVING MAMMALIAN TISSUES, now U.S. Pat. No. 3,736,646, June 5, 1973, METHOD OF ATTACHING SURGICAL NEEDLES TO MULTIFILAMENT POLYGLYCOLIC ACID ABSORBABLE SUTURES.

A continuation-in-part thereof, U.S. Ser. No. 354,043, filed Apr. 24, 1973, is now U.S. Pat. No. 3,867,190, Feb. 18, 1975, Schmitt and Epstein, REDUCING CAPILLARITY OF POLYGLYCOLIC ACID SUTURES. This patent cites some art here pertinent.

U.S. Ser. No. 277,537, Aug. 3, 1972, Glick and Chirgwin, GREEN POLYGLYCOLIC ACID SUTURES AND SURGICAL ELEMENTS.

U.S. Pat. No. 2,552,027, Bird and Rochow, May 8, 1951, CASTING GELATIN TABLETS, in Column 6, line 18 and following shows gelatin formulations for slow and uniform release of therapeutic agents from a carrier matrix.

U.S. Pat. No. 3,773,919, Boswell and Scribner, POLYLACTIDE-DRUG MIXTURES, Nov. 20, 1973, discloses sustained release drugs using a lactide/glycolide copolymer as a carrier matrix. Such polymers are soluble in common organic solvents. This patent lists many drugs which may be incorporated in controlled release carriers. This list is hereby incorporated herein by this reference thereto.

Other United States and foreign patents disclose surgical elements in which biodegradability and absorption results from the hydrolytic attack of tissue components on glycolic acid ester linkages in the polymer composing such surgical elements.

FIELD OF INVENTION

This invention relates to absorbable surgical elements of polyglycolic acid (PGA), which have incorporated therein a drug or medicament which is released into tissue as the PGA is absorbed. A simple but effective implant is a surgical suture containing an antibiotic — the suture serves its usual purpose of retaining tissue in location. The antibiotic aids in controlling the propagation of pathogenic organisms if such are present in the wound being sutured. The antibiotic is released during the period during which pathogenic organisms