

STRONG SELL RECOMMENDATION

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BIOTIME, INC. (OTC Symbol: BTIM)

Closing Price:	\$11 1/8	FY97 EPS:(2)	(\$0.31)
52-Week Trading Range:	\$27-7 1/4	FY97 Loss:	\$3.1 million
Total Shares Outstanding:	9.9 million	Est. FY98 EPS:(3)	(\$0.35)
Fully Diluted Shares:(1)	12.1 million	Est. FY99 EPS:(3)	(\$0.40)

- (1) Includes shares reserved for options and warrants.
- (2) Fiscal year ends June 30th.
- (3) Subject to cash availability.

SUMMARY AND RECOMMENDATION

BioTime claims that Hextend, its principal product candidate, has \$750 million in sales potential. There is no factual or reasonable basis for this claim. BioTime has also claimed that Hextend is a blood substitute product. This claim is also false. Hextend is a plasma expander. It is a simple, commodity-based product that offers no advantages over existing products. If Hextend is approved, it will be one of three products competing in a declining \$30 million market. BioTime's principals have been affiliated with three different companies that claimed to be developing, but never sold any, blood substitute products. BioTime is their most successful stock promotion.

BioTime shares traded at a high of \$27 on October 31, 1997, giving it a market capitalization of over \$290 million. Immediately after BioTime released Hextend's clinical trial results, its stock fell to \$12 per share. BioTime shares fell to their recent \$10 1/2 low after the company disclosed plans to increase its authorized shares. Despite their recent drop, BioTime shares remain grossly overvalued. Even assuming the most optimistic outcomes, we found no legitimate reason for BioTime's current \$135 million market capitalization. As of December 31, 1997 BioTime had \$6.3 million in cash and total assets of \$6.7 million. Among its few non-cash assets are a total of \$127,000 in equipment. In its over seven-year history, BioTime has had no product sales and cumulative losses of \$12.8 million. Even based upon an

unrealistically favorable assessment of BioTime's Hextend profit potential, we value the stock at well below \$2 per share.

COMPANY BACKGROUND

BioTime, Inc. is a 7-year-old development stage biotech company engaged in developing blood substitute products. However, over 10 years ago, in 1987, the same individuals who formed BioTime also founded Cryomedical Sciences, Inc., ("CMSI"). CMSI also sold stock to the public to develop a synthetic blood substitute. CMSI recently traded at \$0.125 per share. In 1991, CMSI's stock traded at over \$20 per share. Before CMSI, BioTime's principals were affiliated with TransTime, Inc. ("TTI"). TTI, incorporated in March 1972, was in the commercial cryonics business (freezing dead bodies). In 1988, TTI and BioTime's principals transferred their rights to a blood substitute solution to CMSI. In 1989, CMSI went public based on the potential of TTI's alleged blood substitute solution. None of these companies possess any viable blood substitute technology or have ever generated any significant revenues or earnings.

ANALYSIS OF HEXTEND

Hextend is a solution of commodity chemicals that is infused into the blood stream to treat severe blood loss. Hextend is not a blood substitute. Hextend can not perform any of the blood's necessary functions and it can cause coagulation abnormalities. As a result, Hextend can only be safely administered in limited quantities. Hextend is, for all practical purposes, identical to its principal competition, Dupont Pharma's Hespan and Abbott Laboratories' Hespan generic equivalent. During 1996 and 1997, BioTime conducted a clinical trial comparing Hextend to Hespan. The trials showed that Hextend offers no advantage over the existing products. The FDA has not yet approved Hextend for marketing. However, because Hextend is very similar in composition to both of the products currently in routine use, and contains only common, widely used commodity chemicals, it may receive FDA approval.

Hextend is composed of a water-based solution of hetastarch, electrolytes, sugar and a buffer. This product contains the same medical-grade starch (hydroxyethyl starch) in the same concentration (6%) as Hespan. It also contains the same electrolytes (sodium and chloride) in the same concentrations (0.9%) as Hespan. The other component is water. To these, BioTime has added sugar, calcium, and a buffer. All of Hextend's ingredients are currently available in other intravenous solutions.

Blood is composed of plasma, red and white blood cells, and platelets. Plasma is the clear, yellowish fluid that is separated from whole blood when the red blood cell component is centrifuged. Plasma performs a myriad of functions. Plasma carries nutrients to the tissues and delivers waste to the kidneys for excretion. It transports drugs, antibodies, hormones and proteins. Importantly, plasma is also the source of clotting factors that enable blood to coagulate. The primary function of red blood cells is to transport oxygen to the tissues. White blood cells fight infection and foreign invaders. Platelets are the first line of defense against vascular injury.

Hextend is not a blood substitute or a synthetic substitute for any blood product. It cannot transport oxygen to the tissues to sustain life, fight infection, carry proteins and does not

contain clotting factors. At the present time there are no synthetic products currently marketed that can transport oxygen in vivo. An enormous research effort, well beyond BioTime's technical and financial capacity, is being directed toward a synthetic red blood cell replacement.

DESCRIPTION OF INTRAVENOUS VOLUME EXPANDERS

BioTime's New Drug Application (NDA) for Hextend as an intravenous volume expander (not as a blood substitute) has recently been submitted to the FDA. Hespan received its original FDA approval in 1972. Abbott recently obtained approval for a Hespan generic. Together, both existing products compete in a shrinking market estimated at less than \$30 million annually.

Hextend is a hetastarch solution. It will compete with Hespan and its generic equivalent in the small, declining hetastarch segment of the plasma volume expansion market. The plasma volume expander market consists of two types of volume expanders called crystalloids and colloids. Crystalloids essentially consist of normal saline (0.9% sodium chloride, salt water), D5W (5% dextrose in water, sugar water), and Ringer's lactate (a solution of sodium chloride, potassium, calcium and a lactate buffer). Colloids consist of albumin (a natural protein derived from human plasma dissolved in normal saline), dextran (a solution of polysaccharides), and 6% hetastarch in saline (like Hextend and Hespan). Dextran is not widely used because of severe adverse reactions in patients.

Approximately 45 million liters of crystalloids are used in the U.S. annually and these sell for approximately \$1 to \$5 per liter. Among the colloids, 5% serum albumin, under currently existing hospital contracts, sells for approximately \$45-\$50 per usual transfusion of 250cc. Estimates of its use purely for plasma volume expansion suggest that approximately 1 million liters of albumin are used annually in the U.S. However, albumin is not used only for intravenous volume expansion. Hespan and its generic 6% hetastarch in saline both sell for approximately \$40 per liter. Annual sales of the 6% hetastarch group are approximately 630,000 liters, and the market is declining.

The crystalloid and colloid products do not replace the blood. Blood replacement products are packed red blood cells, white blood cells (used in only highly specialized circumstances), and platelets. Fresh-frozen plasma is also given both for volume expansion and for replacement of clotting factors. A highly concentrated form of clotting factors, cryoprecipitate, is administered infrequently. Approximately 40,000 units of red blood cells are used daily in the U.S., or about 14 million units a year. A unit represents the quantity of red blood cells, platelets and plasma donated by one individual donor at one time.

A vast majority of human blood is donated. In the U.S., blood centers and hospitals collect and distribute blood and charge various processing and preparation fees. The cost of one unit of packed red blood cells is approximately \$120. One unit of platelets runs \$65, although the most common volume used is 5 units. A unit of fresh frozen plasma costs \$66. Cryoprecipitate costs \$58 per unit, and is usually administered as a pooled solution of 5 units. Hextend's solution is not a substitute for any of these blood products. As a result, the cost of these blood products is not related to the price BioTime can charge for Hextend.

ANALYSIS OF HEXTEND MARKET POTENTIAL

BioTime claims Hextend could possibly be a \$750 million product. These estimates use a \$100 per liter selling price for Hextend and claims that Hextend will capture not only a major portion of the 6% hetastarch market, but also significant portions of the albumin, crystalloid, and fresh-frozen plasma market. There is no reasonable basis for these price or sales potential estimates. Yet BioTime has failed to correct or deny any of these baseless claims. It is absurd to claim that Hextend will take market share from the dependable and widely-used crystalloids at roughly 50 to 100 times their price. It offers no advantage over other colloids on the market, as shown in the company's own studies, which are discussed below. At \$100 per liter, it is highly unlikely that hospital-purchasing agents will buy Hextend, given that it has no demonstrable clinical advantage at more than double their costs for other hetastarch solutions.

There is no reasonable basis to believe Hextend can make inroads into the albumin market. Simply stated, Hextend and Hespan can not perform all the same functions of albumin. Albumin is considered by physicians to be a safe and superior product to hetastarch. BioTime claims albumin poses contamination risks. Albumin is precipitated from plasma by an alcohol process and then pasteurized by heating at 60° C for ten hours. We did not find a single reported case of disease contracted by a recipient from an albumin donor in the 50 years it has been on the U.S. market. Hespan itself has not penetrated the albumin market in the 26 years it has been on the market. There is no reason to believe that Hextend, which is simply a slightly altered version of Hespan, will capture albumin's market.

Hextend can not take market share from fresh-frozen plasma because it does not carry the necessary proteins and clotting factors that characterize plasma. Finally, Hextend cannot replace the function of red blood cells in terms of oxygen-carrying capacity and will never be used as a red blood cell substitute.

The market for Hextend is the same market for Hespan and its generic 6% hetastarch. Hextend's potential market is, at the very best, no greater than \$30 million annually. We do not expect Hextend to capture a major share of its \$30 million market unless its price is reduced well below the prices of better known, well established DuPont's Hespan and Abbott's generic hetastarch solutions.

DESCRIPTION OF HEXTEND CLINICAL TRIAL RESULTS

BioTime's Hextend Phase III trial showed no statistically significant therapeutic or clinical superiority in comparison with Hespan. The trial was designed to show no more than safety and therapeutic equivalency to Hespan, and that is exactly what it showed. The primary endpoints of heart rate, blood pressure and urine output were met. The company has made claims about average post-operative heart rate and less urine output intraoperatively in the Hextend group, implying that these represent a clinical advantage. In fact, there was no medically significant difference in heart rates and reduced urine output is usually the result of inadequate hydration, and on the contrary, is less desirable clinically. Regardless, like virtually all else in the study, the heart rate and urine output results in the two groups showed no statistically significant difference.

There was no significant coagulation abnormality difference in the two solutions. It is important to understand the coagulation abnormalities caused by the high molecular weight hetastarches in order to appreciate the potential risk associated with higher volume infusions. Not only can hetastarch solutions cause deficiencies in coagulation factors that are essential for clotting, but they can also produce lower platelet counts that can prolong bleeding. Specifically, hetastarch solutions can cause deficiencies of coagulation Factor VIII, also known as antihemophilic factor. The disease characterized by the absence of Factor VIII is hemophilia. Hetastarch solutions can also cause a similar disease, a reversible acquired von Willebrand-like syndrome (Factor VIII deficiency associated with platelet aggregation abnormalities), in which both clotting and bleeding abnormalities occur. The laboratory measurements of these abnormalities include prolongation of the prothrombin time, the partial thromboplastin time, the bleeding time, and a reduction in the platelet count. Hetastarch solutions can also cause disseminated intravascular coagulation (consumption of the clotting factors within the bloodstream) and hemolysis (destruction of the red blood cells intravascularly).

Most of these abnormalities tend to be seen when higher volumes of hetastarch solutions are given. When Hespan was initially marketed, deaths were reported from intracranial bleeding. Hespan's label suggests limitations on volume use of Hespan to no more than 20cc/kg body weight. Many hospitals currently limit its use to 500-1000cc. BioTime has not released the complete coagulation profiles of Hextend's study patients. However, the fact that the post-operative measurements of coagulation were equally abnormal in both groups and the platelet counts equally reduced in both groups suggests that Hextend's adverse effects on coagulation and bleeding is no different than Hespan.

DESCRIPTION OF HEXTEND MARKETING AGREEMENT

In the BioTime Form 8-K filed on April 24, 1997, the Abbott license agreement describes payment of \$1 million 45 days after signing the agreement and an additional \$1.5 million in installments upon the achievement of specific milestones. The agreement states that "Up to \$37,500,000 of additional license fees will be payable based upon annual *net* sales of Hextend, at the rate of 10% of annual net sales if annual *net* sales exceed \$30,000,000 or 5% if annual net sales are between \$15,000,000 and \$30,000,000." The license fees are undisclosed if annual net sales are below \$15 million. In addition to the license fees, Abbott will pay BioTime a royalty based on annual net Hextend sales. The royalty rate will be 5% plus an additional 0.22% for each \$1 million of annual net sales, up to a maximum royalty rate of 36%. We estimate Hextend sales potential to be, at best, less than \$10 million, which would provide BioTime with royalty and license income of less than \$1 million.

HEXTEND'S PROJECTED MARKET ENTRY

BioTime has stated that it expects Hextend's NDA application to receive expedited review and be approved in the second half of 1998. Under the FDA Modernization Act of 1997, the FDA will, at the request of a sponsor, "facilitate the development and expedite the review" of a drug or biologic "if it is intended for treatment of a serious or life-threatening condition and it demonstrates the potential to address unmet medical needs for such condition." Hextend is one of many intravenous solutions that can be used for a serious or life-threatening condition. It does not address an unmet medical need for any condition. We believe that Hextend will

not receive expedited review or approval. The average time for FDA review and approval of an NDA is approximately one year from the date of submission of the completed application.

We assume that BioTime will receive FDA approval and that Abbott will market Hextend. Based upon the disclosed clinical data, which presumably has been submitted to the FDA in the BioTime NDA, we found no reason to believe that the label for Hextend will be in any way significantly different than the label for other 6% hetastarch solutions. If its FDA application is in order, and if its clinicals were conducted correctly, we expect that Hextend will be approved with the normal volume limitations of any hetastarch product.

CONCLUSION

BioTime should be valued based on Hextend's sales potential and the BioTime-Abbott license agreement. There is no reason to believe Hextend can sell at any price higher than other hetastarch solutions. Therefore we believe Hextend will have to be priced below its well-known competitors to achieve any sales. However, even assuming that BioTime captures 50% of the hetastarch market at more than double the competition's prices, annual net sales will be less than \$30 million. Even at this unrealistically high sales level, license fees and royalties would yield less than \$5 million in maximum revenues before expenses. As a result BioTime's own pricing plan fails to yield positive results for its shareholders.

Hextend has shown no clinical superiority over other hetastarch solutions on the market. The BioTime study has demonstrated that Hextend causes the same coagulation and bleeding abnormalities as Hespan and the Abbott generic. If Hextend ever comes to market, we believe the added supply will cause a sharp drop in prices. Hextend offers investors no net earnings possibility based on any reasonable price and volume estimates. We believe that investors will soon realize that management has fraudulently overstated Hextend's extremely limited value, unit sales and earnings potential. As a result we believe BioTime shares will trade well below \$2 a share.

Short selling involves a risk not associated with the purchase of stock including, but not only limited to, unlimited loss and stock borrowing risks.