Title: ABC103 from bench to bedside: development of a drug-eluting polymer implant which prevents post-surgical lung cancer recurrence

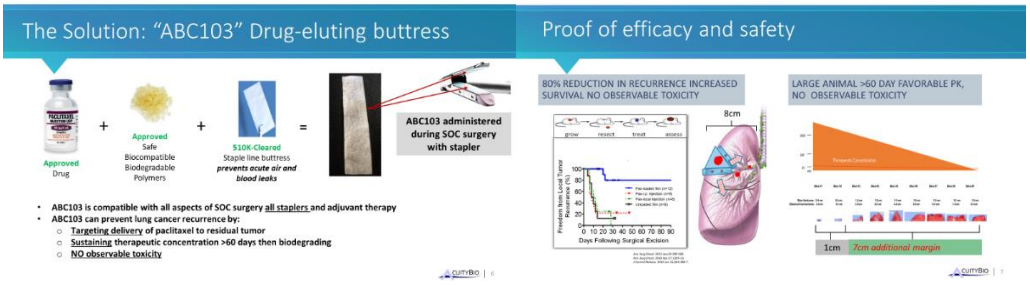
Author: John J. Schwartz, PhD, AcuityBio Corporation, 321 Walnut Street #300, Newton, MA 02460, jay@acuitybio.com

Abstract disclosure statement: Dr. Schwartz has an ownership interest in, and is employed by AcuityBio Corporation, which supported this work

ABSTRACT: Worldwide, 234,000 lung cancer patients per year are surgically treated with curative intent. Unfortunately, 30-70% of these patients will succumb to cancer recurrence despite best available standard of care adjuvant chemotherapy. A talented thoracic surgeon-scientist was dissatisfied with their inability to treat their patients more effectively. They observed that the key drawbacks in standard of care treatment for these patients are all related to administration of systemic adjuvant chemotherapy. Chemotherapy drugs are effective at killing tumor cells in vitro. However, they all induce dose-limiting, off target toxicities related to lack of targeting thereby preventing the use of sustained administration. The result seen in the clinic is dismal lung cancer survival and significant treatment-associated toxicity. The surgeon posited that "if only" they could administer an implant at the time of surgery, with a drug which would not induce local or regional toxicity, prevent healing of the surgical margin and 'mop up' residual microscopic disease they could increase patient survival. The surgeon collaborated with a polymer chemist at another institution to invent a new drug-delivery polymer to fashion into a prototype for this purpose. The prototype worked in peer reviewed, published proof of concept experiments. However, a complete redesign of the implementation and formulation needed to be undertaken in order to provide a product which could be manufactured, pass regulatory review, be reimbursed and engineered to be readily adopted by surgeons. The result of this redesign is ABC103 a drug-eluting surgical staple line buttress.

AcuityBio, Inc. is focused on the commercialization of novel polymer drug-delivery technologies to treat various types of early stage, soft tissue cancers. The company's lead product candidate, ABC103, utilizes the FDA-approved drug paclitaxel with 510(k)-cleared surgical staple line buttress and polymers, creating a proprietary drug-delivery solution to prevent post-surgical lung cancer recurrence. FDA regulatory review has resulted in the grant of Orphan Drug status and a defined and abbreviated 505(b)(2) regulatory review pathway to approval.

ABC103 addresses and solves the key constraints of current standard of care therapy for surgically resected lung cancer patients. ABC103 has been engineered for GMP manufacture using approved components, shown below. ABC103 is administered at the time of resection with approved endoscopic cutting staplers as part of standard surgical procedures. Administration of ABC103 as an adjuvant to standard of care surgery enabled the safe, sustained delivery of therapeutic levels of paclitaxel for greater than 60 days to at-risk sites, thereby preventing recurrence, shown in proof of efficacy and PK data below.



AcuityBio's ABC drug-delivery platform technology can be used to deliver additional compounds and ABC103 itself may be safely co-administered as an adjuvant to immune-oncology drugs enhancing their efficacy. The criticality of customer needs discovery and regulatory constraints in designing a successful medical innovation will be discussed.

Keywords: Orphan Drug, 505(b)(2), combination product, drug-delivery, lung cancer, translational medicine