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COMPANY NOTE

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October 10, 2016

Spring Bank Pharmaceuticals, Inc.
(SBPH/NASDAQ/$12.25/Not rated)
Arrowhead Pharmaceuticals, Inc.
(ARWR/NASDAQ/$7.04/Not rated)

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SBPH/ARWR Novel Clinical Collaboration Announced

Arrowhead Pharmaceuticals and Spring Bank Pharmaceuticals announced on October 6th the initiation of an innovative clinical collaboration that seeks to bring together the companies' respective lead clinical assets in a novel combination therapy for Hepatitis B viral infection. The collaboration will center on Spring Bank's SB9200 clinical stage compound, currently in Spring Bank's ACHIEVE Phase II trial, and Arrowhead's ARC-520 Phase II RNAi compound, currently being evaluated in ARWR's MONARCH Phase II trial. SB9200 will add an immuno-modulatory component to the RNAi gene silencing mechanism of ARC-520.

The collaboration will initially evaluate the combination of SB9200 and ARC-520 in preclinical models before the SB9200/ARC-520 combination is added as an additional cohort in Arrowhead's currently enrolling MONARCH Phase IIb trial. The combination will be further evaluated as part of a regimen incorporating already approved nucleotide(side) polymerase inhibitor agents (NUCs) such tenofovir and entecavir. The Companies hope that by applying a multi-disciplinary triple combination approach to HBV treatment, HBV functional cure rates can be increased with better treatment tolerability, and perhaps a shorter treatment duration compared to current standard of care with interferon-based therapies.

In the absence of a true cure for HBV, achieving HBV antigen seroconversion has become the target of a "functional" cure, whereby antiviral therapy can be terminated because the patient's own immune system takes over. Seroconversion is defined as the loss of HBV surface antigen presence in the patient's blood on two occasions at least 6 months apart. The ARC-520 technology uses RNAi machinery to direct specific cleavage of HBV RNA transcripts, thereby reducing the levels of HBV proteins and the RNA template used to produce viral DNA. Reducing the load of circulating and non-circulating viral proteins and RNA will hopefully allow for re-constitution of an effective host immune response and ultimately HBsAg (hepatitis B virus surface antigen) seroconversion. SB 9200 binds to and upregulates RIG-1 and NOD2 which interferes with the virus's ability to replicate at a different level when it usurps the patient's own immune system machinery and at the same time, SB 9200 increases endogenous IFN (interferon) production. In this setting, SB 9200 functions as an immune-stimulatory adjuvant which may provide a 1+1 equals more than 2 augmentation of the patient's own immune system.

From the Spring Bank perspective and in light of our comments in our Industry Note of October 3rd, we consider this an important first step for Spring Bank in terms of validating the Company's technology as an immuno-modulatory platform that may be broadly applicable across a number of indication settings. *SG*

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