Vetigenics aims to solve challenges in canine immunotherapy discovery and development

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Adriann Sax has been appointed to advance Vetigenics from an academic start-up to an independent animal health biotech company.

Ms Sax was hired earlier this year as the firm's chief executive. While her undergraduate education and early career focused animal health, Ms Sax has spent the last several decades in the human biopharma sector – working across large corporatior start-ups, with a particular focus on developing oncology and antibody-based therapeutics.

"Harnessing the power of the immune system to treat cancer and immune-related disorders in humans has resulted in impr survival, quality of life and reduced toxicity for people suffering from these devasting diseases," she told IHS Markit Animal H "There is now an increasing demand to develop safe, targeted immunotherapies for veterinary use so dogs may enjoy the sa therapeutic benefits of this powerful approach."

Vetigenics is the brainchild of founders Nicola Mason and Don Siegel of the University of Pennsylvania. Dr Mason is a leader i veterinary medicine and immunotherapy with extensive experience in the performance of clinical trials in pet dogs using immunotherapy. She is a National Institutes of Health-funded researcher in the areas of comparative oncology and autoimm

Dr Siegel is an internationally recognized authority in antibody phage display and has been a National Institutes of Health fu researcher in the areas of immunohematology, hemostasis, thrombosis, autoimmunity and oncology. Among his career accomplishments is participating in the development of CD19-directed chimeric antigen receptor T (CAR-T) therapy, which w first FDA-approved genetically modified cellular therapy in human medicine licensed from UPenn and marketed under the b name Kymriah by Novartis.

Founded in 2017, Vetigenics originally focused on development of immunotherapies for use in dogs with spontaneous disea accelerate the treatment of human cancers. However, Ms Sax is now helping the start-up look at the other end of the One He spectrum and produce antibody therapeutics for the animal health market.

Vetigenics has exclusive access to canine single chain fragment variable (scFv) phage display libraries developed by Drs Ma Siegel. This platform is estimated to contain over 40 billion independent scFv members.

In its vast discovery library, Vetigenics has the potential to pursue a wide variety of different therapeutic formats including fu monoclonal antibodies (mAbs), bi- and multi-specific antibodies, bi-specific T cell engagers (BiTEs), CAR-T and other therapies.

Speaking at the recent Animal Health Investment One conference, Ms Sax stated: "Our proprietary phage display technology derived from natural canine immunoglobulin gene rearrangements, and selection of antibodies from our phage display librar not subject to the tolerance mechanisms that plague other technologies that rely on animal immunization. We can rapidly g multiple, fully canine antibody candidates against multiple epitopes of a specific target antigen with drug-like qualities read ***vitro*** and ***in vivo*** validation.

"Currently marketed human immunotherapies that might cross-react with canine antigens would be rapidly rejected by the c immune system, rendering them ineffective. Development of entirely canine antibody therapies is needed to provide effecti target-specific, treatments for dogs with cancer and immune-related diseases.

"Existing competitive methodologies include chimeric or caninized murine antibodies, *in silico* design of canine-like antibodi phage display of synthetic canine gene segments, and use of transgenic mice expressing a portion of the

repertoire of canine antibody genes. These approaches are expensive, technically challenging, time consuming, require late-stage validation of binding affinity and specificity, and may induce anti-drug antibodies that limit their efficacy *in vivo*.

"Alternative approaches trying to generate canine antibodies through dog immunization are unlikely to yield high affinity antibodies to canine antigens because of natural immune tolerance mechanisms. Antibody-based immunotherapies have revolutionized the treatment of cancer and immune-related diseases in humans. However, this success has yet to be achieved for use in dogs due to the lack of validated, non-immunogenic, affordable and easily administered canine antibody-based medicines."

Vetigenics has "over four candidates" for the treatment of cancer and autoimmune disease that have passed the *in vitro* validation stage. The company is now moving its most advanced candidates to small-scale production for pilot studies in dogs by the year's end.

Commercial goals

Ms Sax stated: "Our goal is two-fold. One is to continue advancing our own product candidates and the second is to explore target antigen discovery collaborations with strategic partners. We think our value proposition is the power of our platform technology together with our ability to rapidly test novel therapies in dogs. These capabilities could be extraordinarily valuable for partners.

"If a company is interested in pursuing a research collaboration with us, we can very rapidly raise multiple candidates and move them through identification to lead candidate selection. In terms of the time from discovery to pre-clinical, clinical or pilot, we can reduce that significantly. We are able to generate multiple candidates to a target antigen for *in vivo* validation within weeks versus months.

"Other methods of developing antibodies can be time-consuming and have problems with affinity. I'm not saying all the other technologies are bad, but they are still plagued with problems because the antibodies are not native to the dog. Ours are completely natural."

Philadelphia-based Vetigenics has previously benefited from a $300,000 Small Business Innovation Research grant. While the firm has other grants pending, Ms Sax said it is eyeing supplementary funding to further advance additional candidates.

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