

BIOBUSINESS BRIEFS

DEAL WATCH

Cytos expands collaborations in therapeutic vaccines

Pfizer and Cytos Biotechnology have entered into a 150 million Swiss francs global agreement to research, develop, manufacture and commercialize novel therapeutic vaccines based on Cytos's Immunodrug technology.

Pfizer receives the option to license exclusive worldwide rights to the undisclosed vaccines, while Cytos receives 10 million Swiss francs upfront and is eligible to receive up to 140 million Swiss francs in milestone payments and technology-transfer fees, plus potential royalties. This deal is in addition to Pfizer's 2005 agreement with Cytos to develop vaccines for animal health applications.

Therapeutic vaccines, which can harness the host immune system by inducing B-cell antibody responses and/or by stimulating T cells, have shown promising results in the treatment of chronic disorders such as cancer (*Nature Rev. Drug Discov.* 3, 81–88; 2004). Cytos's Immunodrug platform is based on virus-like particles (VLPs) —

recombinantly produced viral proteins that spontaneously assemble into viral structures. These contain no replicative genetic information but retain key immunological features such as repetitive surfaces.

Target antigens — which can be from foreign sources or endogenous molecules associated with disease — are engineered to allow chemical crosslinking onto the VLP surface. For disorders in which the aim is to stimulate antibody production against the antigen — for example, against angiotensin II for treating hypertension — B cells are activated by the repetitively linked antigens on the VLP surface and produce antibodies against them. For other disorders in which it is important to stimulate a T-cell response, such as cancer and allergy, antigen-decorated VLPs are also packaged with an immunostimulatory synthetic DNA sequence known as G10.

At present, five vaccine candidates based on the Immunodrug platform are in



Phase II trials: NIC002 for nicotine addiction, CYT006-AngQb for hypertension, CYT003-QbG10 for allergy, CAD106 for Alzheimer's disease and CYT004-MelQbG10 for melanoma. A Phase IIa trial of CYT006-AngQb providing proof-of-concept was published earlier this year (*Lancet* 371, 821–827; 2008).

Two of these vaccine candidates — NIC002 and CAD106 — are being developed in partnership with Novartis. Cytos's collaborations with Novartis on therapeutic vaccines began in 2001, initially in areas including chronic nervous system disorders. Novartis then entered into an exclusive license agreement to develop NIC002 in 2007.