

TECHNOLOGY OFFERS

Scaffold-stabilized L2 Peptides as HPV Vaccine (P-824)

Scaffold-stabilized L2-peptides that can be easily produced in E. coli for cost-effective vaccine production

EXECUTIVE SUMMARY

Cervical cancer is women's second most frequent cancer worldwide with an estimated 500,000 cases and approx. 250,000 deaths per year. It has been established that infection with certain ("high-risk") types of HPV is the most important risk factor for the development of cervical cancer. Our researchers has come a huge step closer to a solution for this cancer: the thioredoxin-L2 vaccine can be produced in standard E. coli bacteria. The thioredoxin-L2 vaccines consist of thioredoxin as a "scaffold" protein and one of several L2 peptide concatemers. The most effective peptides have been identified by epitope mapping; a positive correlation of the number of peptide units in the concatemer with the titer of neutralizing antibodies has been shown.



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Category

Vaccine

Indication

Cervical
Cancer

Development stage

Phase 1

Seeking

Licensing, Development
Partner

BENEFITS

- Simple production in E. coli
- Increased titer of neutralizing antibodies
- Cross-immunity against all cancerogenic HPV strains
- Heat-stable vaccine, no cold chain required

TECHNOLOGY BACKGROUND

Two vaccines for cervical cancer which are commercially available were developed based on the HPV L1 protein. There are, however, some drawbacks to these L1- based vaccines: the immune reaction against L1 is mostly type specific, meaning that there is hardly any cross-protection against HPV types that were not included in the vaccine. Also, the L1 vaccines have to be produced either in yeast or in insect cells, which makes production cost-intensive. Our international team of researchers has come a huge step closer to a solution of these problems: the thioredoxin-L2 vaccine can be produced in standard E. coli bacteria, which makes a cost-effective production feasible. Moreover, immunization against peptides from the L2 protein gives a robust immune reaction that provides cross-protection against a variety of other high-risk HPV strains

DEVELOPMENT STAGE

Scaffold-stabilized L2-vaccines have been produced and their efficacy has been shown in animal models.

APPLICATIONS

The proteins can be used as a vaccine to induce immunity against HPV primary infection (preventive vaccination), which can be used against a variety of high-risk HPV strains.

INTELLECTUAL PROPERTY

Patent application submitted.

- A priority patent application "Immunogenic polypeptides comprising a scaffold polypeptide and a L2 polypeptide or fragment thereof" EP 2199301 was filed December 19, 2008. A subsequent PCT was published as WO2010070052A2, which was nationalized as EP2376525B1 (granted) and US9303082B2 (granted).

PUBLICATIONS & REFERENCES

- Rubio et al. "Potent anti-HPV immune responses induced by tandem repeats of the HPV16 L2 (20 -- 38) peptide displayed on bacterial thioredoxin" in [Vaccine 2009 Mar 18;27\(13\):1949-56](#).
- Seitz et al. "Influence of oxidation and multimerization on the immunogenicity of a thioredoxin-I2 prophylactic papillomavirus vaccine" in [Clin Vaccine Immunol. 2013 Jul;20\(7\):1061-9](#).

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ABOUT THE DKFZ INNOVATION MANAGEMENT

Working at the interface of research and industry, the Innovation management of the German Cancer Research Center (DKFZ) helps to get new cancer medications, diagnostic tests, and research instruments onto the market as quickly as possible.

The DKFZ with its more than 3,000 employees is the largest biomedical research institution in Germany. At the Center more than 1,300 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. DKFZ is a member of the Helmholtz Association of National Research Centers, with ninety percent of its funding coming from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg.