Immunotherapy for Chronic Liver Diseases

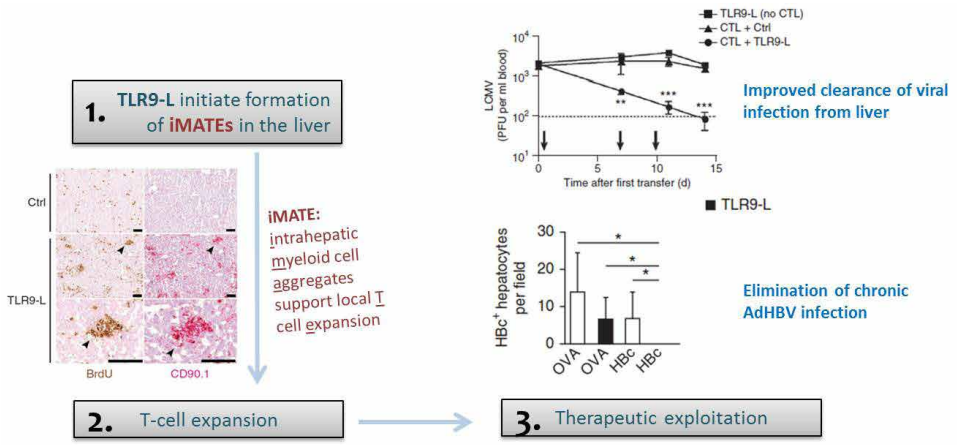
Reference No: B72272

CHALLENGE

Immunotherapy of chronic hepatitis B is particularly difficult as the hepatic microenvironment is limiting local **cytotoxic T lymphocyte (CTL)** proliferation after infection. However, CTLs are an **important element for overcoming chronic infections** of the liver. So far only a prophylactic vaccination against hepatitis B virus is available and a protection post-infection by means of vaccination has not been possible to this point. Accordingly, there is a strong demand for new therapeutic options.

INNOVATION

A so far unrecognized anatomic compartment within the liver tissue consisting of myeloid cells - called **iMATEs ("intrahepatic myeloid-cell aggregates for T cell population expansion")** - can be exploited as a novel vaccination strategy against chronic viral liver infections. iMATEs overcome regulatory cues that limit immune response during chronic liver infections and **support local CTL expansion** by generation of cocoon-like structures. A dramatic expansion of CTLs in the liver can be achieved by targeted stimulation of iMATEs with TLR9-L as a **prophylactic or therapeutic vaccine.** The proof-of concept has been shown *in vivo* in mouse models.



COMMERCIAL OPPORTUNITIES

The present invention provides a convenient and reliable **prophylactic** as well as **therapeutic vaccine** strategy. The use of TLR9 agonists induces the formation of iMATEs, which generate a sufficient number of CTLs resulting in the **overcoming of chronic viral infections.**

Further advantages and opportunities:

- use as **prime - jump strategy** for enhancement of CTLs
- entities of CTLs are increased at least 5 fold in peripheral organs (e.g. liver)
- use as a prophylactic or therapeutic vaccine **against infections with an intracellular pathogen**
- readily available as a kit, containing a prime agent and a multiplying jump agent

DEVELOPMENT STATUS

Proof of concept *in vivo*.

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3. Protzer, U., Maini, M.K. & Knolle, P.A. Living in the liver: hepatic infections. Nat. Rev. Immunol. 12, 201–213 (2012).

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