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Licensing Opportunity

Inhibition of the FGF pathway for fighting viral diseases

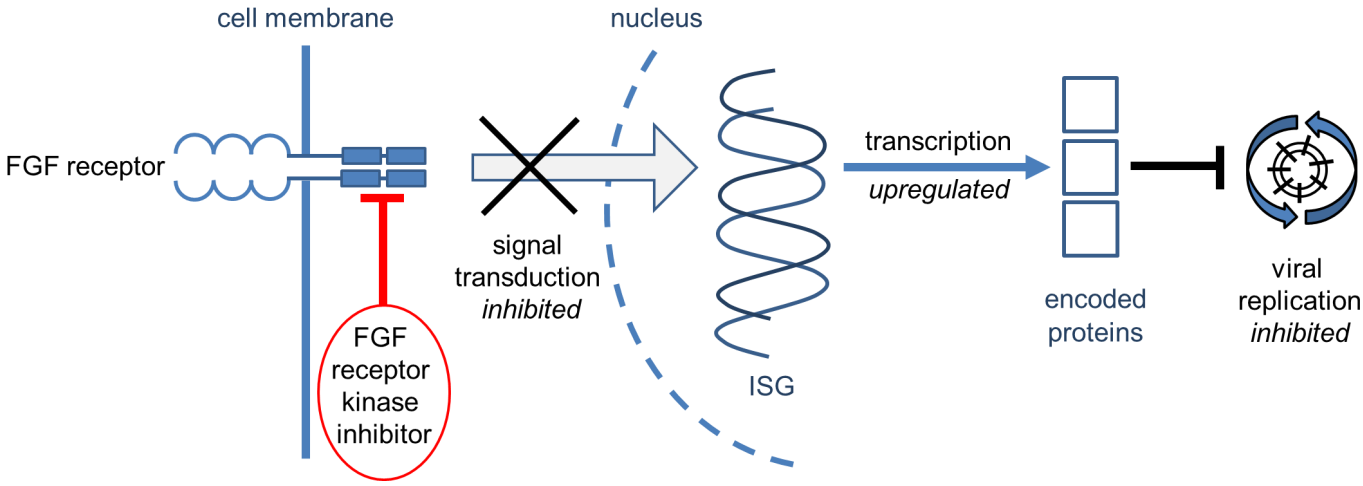

Fig. 1 Consequences of blocking the FGF receptor kinase activity: The transcription of the interferon stimulated genes (ISG) is upregulated and the encoded proteins interrupt the viral life cycle.

Application

The invention offers a therapeutic treatment against different viruses, in particular Herpes simplex virus, corona virus, adenovirus, encephalomyocarditis virus, lymphocytic choriomengitis virus and Zika virus.

Features & Benefits

- New means for the treatment of viral infections
- New pathway for boosting or regulating the interferon response
- Systemic (injections) or topical use (creams) of drugs at the site of infection
- Drugs are already in clinical trial phase for cancer treatment and are fairly well tolerated

Publications

- Maddaluno et al. “Antagonism of interferon signaling by fibroblast growth factors promotes viral replication“, EMBO Mol Med (2020) 12: e11793 https://doi.org/10.15252/emmm.201911793
- Patent pending

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Technology Readiness Level

Background

Viral infections are generally difficult to treat and this is also true e.g. for Herpes simplex virus (HSV) 1 and coronaviruses, such as SARS-CoV2. Current treatment strategies aim at the inhibition of selected viral proteins, such as the thymidine kinase of the Herpes simplex virus. However, the inhibitors show a certain toxicity and mutagenic potential. Also, the virostatic activity is restricted to a small number of viruses. Helicase-primase (for HSV-1) or RNA polymerase (for RNA viruses) inhibition is an alternative approach, but it has major side effects. Therefore, new approaches for the treatment of different viral infections are urgently needed.

Invention

Loss of FGF receptor kinase activity significantly reduces viral infection/replication. Tests on mouse skin infected with HSV-1 have shown that drugs blocking the FGF receptor kinase activity effectively interfere with the viral life cycle. The antiviral effect was shown to result at least in part from increased expression of various interferon response genes. The FGF receptor kinase activity and its downstream signaling process can be suppressed or even completely stopped by a variety of existing drugs, which are currently in the clinical trial phase for cancer treatment. The compounds/ drugs are either FGF receptor kinase inhibitors, FGF receptor ligand traps or neutralizing antibodies. In a mouse skin ex vivo model AZD4547 was successfully tested to reduce HSV-1 infection/replication. In addition, several FGFR inhibitors, including AZD4547, BGJ398, Debio 1347, LY2874455 and Erdafitinib blocked replication of different viruses in vitro.