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Advanced in Nanomedicine Drug Delivery Application for HIV Therapy

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Abstract: *HIV is the chronic disease and patient adherence to treatment is critical over a lifetime Nanomedicine Application can improve a variety of pharmacological problem from Increasing bioavailability to specific targeting to the site of action.The application of Nanomedicine to present and future HIV treatment may offer bespoke solution to the problem faced by established formulated drug. In this review We are discuss about the advance in Nanomedicine drug delivery application for HIV therapy. poor aqueous drug solubility is the major limitation negativity impating oral bioavailability for many antiretraviral drug.HIV is a long term disease patient adherence therapy is critical over a lifetime.*

Keywords: Include Nanomedicine. Biocompatibility. HIV/Long acting Antiretraviral

I. INTRODUCTION

1. The action as such reduced drug concentration low toxicity and Rise bioavailabilityTargeted.
2. Nanomedicine action to drug distribution of therapeutic concentration of ARV.
3. Long acting Nanomedicine may reduced the risk impact of poor patient adherence.

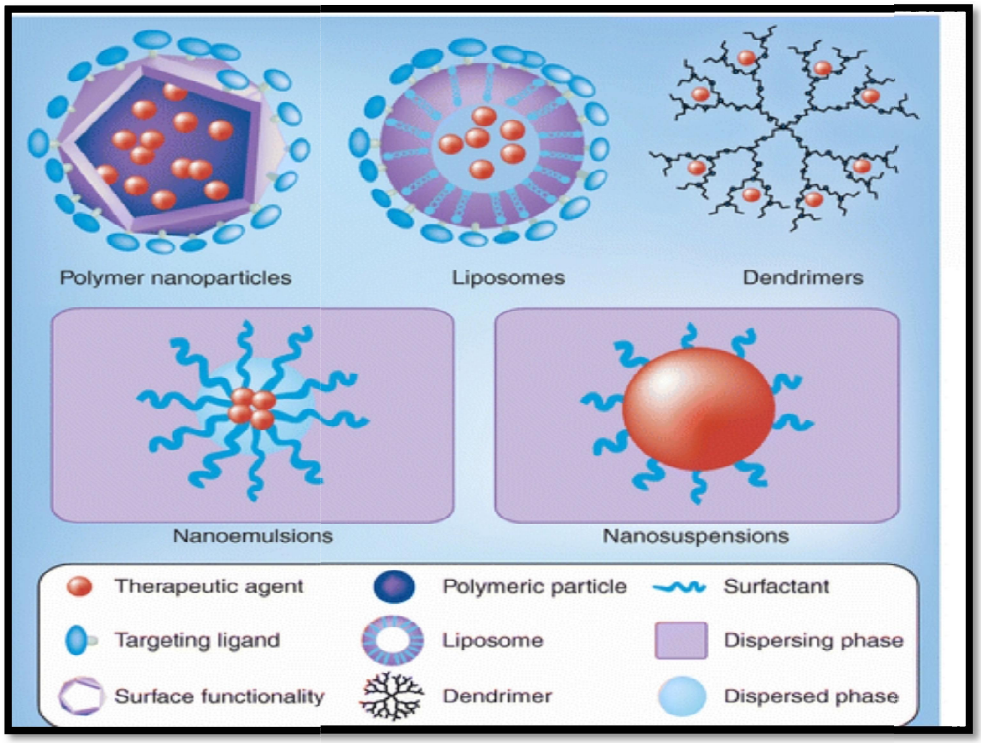

Fig.1 Shows some of the limitation of current antiretroviral therapy and opportunity to address these limitation via Nanomedicine.

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II. ORAL NANOMEDICINE

The solid drug nanoparticle formulation (SDNF) in this formulation the present system to rise bioavailability of poor solubility in water.

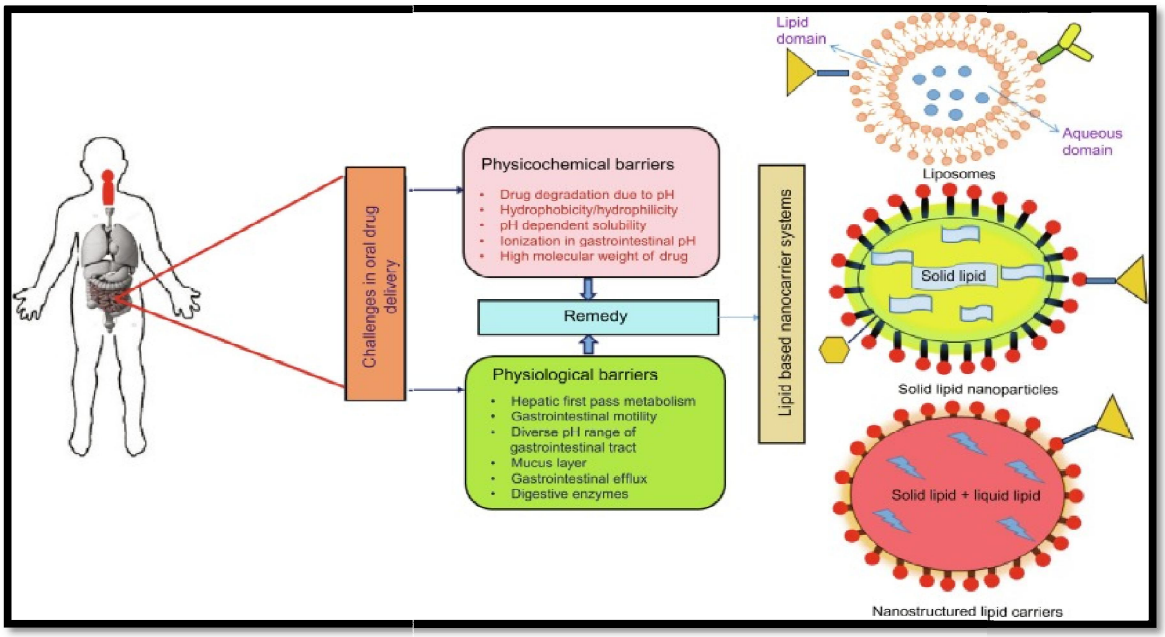

Fig. 2 Nanotechnology for oral drug delivery

Techniques: To determine the rate of standard preclinical formulation is consider.

Oral Nanomedicine for pediatric for Mulation

presently the ritonavir (RTV)boosted lopinavir (LPV)oral liquid formulation is WHO.In vivo pharmacokinetic profiles for lopinavir without the need of organic solvent.

Nanomedicine Injectable for Long Acting

The need for combination ART and physicochemical and dosing limitations of dosing limitation of present ARV drug impede attempt to Redevelop them as long. Newly Rilpivirine has been nanoparticle injectable (LAI) Rilpivirine was administered in rat and dog as single subconsciously for time profile shows substained and dose proportional Release. over 2 Month in rat and 6 month in dog. Where effective plasma concentration remained 10ng/ml for up to 26 Week.

The most advanced long acting injectable Remain prepared a two drug combination on integrase administered as a separate injection multiple antiretraviral drug are potentially improve patient complaince.Lopinavir (LPV)and Ritonavir (RTV)and Tenafovir were developed.

The lipid formulation was administered subcutaneous injection to rhesus macaque to favorably.Tenofovir plasma mononuclear cell concentration are perceptible over of concentration of peripheral blood.2 Week peripheral blood mononuclear cell exposure of all tenofovir and tenofovir diphosphate was higher marketed in compared with standard oral tenofovir disoproxil fumrate.

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III. COULD RADICALLY IMPROVE THERAPY OF VIRAL RESERVOIRS

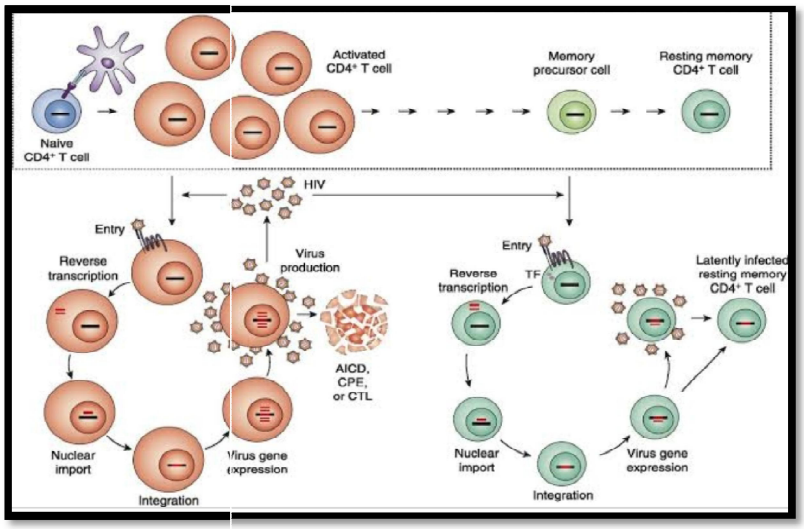

Fig. 3 Long acting antiretroviral drug

Nanomedicine HIV Viral to Immune Cell

Targeting the HIV replication cycle by inhibiting the ability of HIV-1 to fuse and/or enter a target cell has been the focus of several published studies . Fusion or entry inhibition leads to inhibition of viral activity and viral cytotoxicity.In the targeting Nanomedicine fusion or viral activity HIV.

Unlike synthetic nanoparticles, extracellular vesicles (EVs) are naturally occurring nanoscale structures that carry cargo (e.g., proteins, lipids, nucleic acids) and can be released from both healthy and apoptotic cells . Recently, Palomino et al. discovered that EVs released by Lactobacillus in the healthy vaginal microbiota prevented HIV-1 attachment to target cells and thereby inhibited HIV-1 infection . In a recent study by Welch et al., EVs extracted from semen inhibited HIV-1 in vitro regardless of HIV infection status of the donor, while EVs extracted from the blood and semen of ART-treated subjected inhibited HIV-1 in vivo . These studies suggest a potential avenue for bacterial and/or EV-based treatment strategies in preventing HIV-1 viral spread.

IV. TARGETED NANOPARTICLES

4.1 Future Perspectives

Despite increasing interest in nanomedicines, there are still significant gaps in knowledge of the underlying mechanisms. For example, a greater understanding of drug release following LAI injection is needed. Recent work on similar SDN formulations of paliperidone palmitate has demonstrated the importance of granuloma and phagocytosis by infiltrating macrophages . Further support for the role of macrophages has been demonstrated in rodents, where nanoparticle-mediated activation of autophagy led to 50-fold increase in the plasma concentration of the viral integrase inhibitor dolutegravir.

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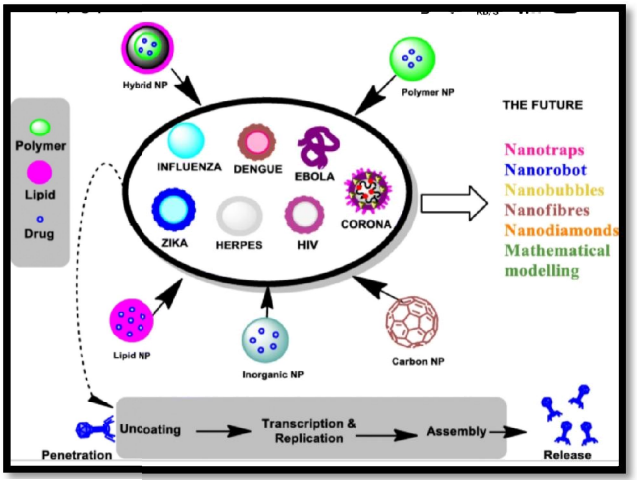

4.2 Safety

The Particles range in size (1–1000 nm), functionality, charge and composition . This diversity means that existing immunological assays are sometimes inadequate to account for nanoparticle characteristics . For example, some nanoparticles possess catalytic properties which interfere with assays meaning careful scrutiny is needed to ensure validity of in vitro toxicity tests

Many nanomedicines aim to alter the pharmacokinetics or distribution. Thus, there is a need to better understand the exposure–response relationship, particularly for nanomedicines that interact with the immune system. In case of HIV infection, greater accumulation within macrophages may have a therapeutic benefit as a sanctuary site for the virus. However, increasing exposure to macrophages may exacerbate the impact on cell function thereby necessitating careful understanding of what is required pharmacologically as well as in terms of safty.

V. CONCLUSION

In summary a great and good understanding of the mechanisms pinning Nanoparticles-action preclinical promise can be recognized for injected pateint across the various nanotechnology being explored.We highlighted the potential and use of Nanoparticle to facilitate and Improve the delivery.

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CONFLICT OF INTEREST

The author declared no conflict of interest.

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