time with the high amount of drug within 3 to 12 hours, demonstrating the enhanced percutaneous penetration of cytarabine (Raj et al., 2018). Ethosomes have been shown to be a promising vehicle for transdermal delivery of paeonol, which shows antiinflammatory, antidiabetic, and pain-relieving activities (Ma et al., 2018). Further, ethosomal hydrogel was able to significantly enhance the skin permeation parameters and skin deposition of encapsulated resveratrol in comparison to the conventional cream (Arora and Nanda, 2019).

Besides ethosomes and Transfersomes, there is an additional type of deformable vesicle i.e., transethosomes, which contain surfactants as well as ethanol. Transethosomes enhanced both *in vitro* and *in vivo* skin deposition of voriconazole in the dermis/epidermis region compared to conventional and deformable liposomes and control (Song et al., 2012). Ascenso et al. (2015) studied Transfersomes, ethosomes, and transethosomes for the incorporation of actives of different polarities, i.e., vitamin E and caffeine, in order to evaluate the effect of the carrier on skin permeation and penetration of actives. Transethosomes were shown to be more deformable than ethosomes and Transfersomes due to the presence of both ethanol and surfactant in their composition. However, all these vesicles, especially transethosomes, were shown to be suitable as skin delivery systems, being capable of delivering active molecules into different skin layers under certain conditions. Moreover, transethosomes have been shown to enhance the transdermal delivery of the antihypertensive drug olmesartan medoxomil (Albash et al., 2019). Transethosomes have also been shown to be a promising transdermal drug delivery system for sinomenine hydrochloride in the treatment of rheumatoid arthritis (Song et al., 2019).

Elastic liposomes showed higher efficiency in the transdermal delivery of gabapentin through porcine skin than the compounded pluronic lecithin organogel (Le et al., 2018).

A new interesting approach is the combination of flexible liposomes (FL) and sponge *Haliclona* sp. spicules (SHS), referred to as SFLS (SHS-Flexible Liposomes Combined System), for topical drug delivery, which has been shown to result in improved skin absorption and deposition of hyaluronic acid, especially in deep skin layers, due to the synergistic effect of liposomes and sponge spicules (Zhang et al., 2019).

Invasomes have been invented by the group of Prof. Alfred Fahr (Verma, 2002). These vesicles for enhanced skin delivery of drugs are composed of phosphatidylcholine, ethanol, and a mixture of terpenes as penetration enhancers, which increase the fluidity of the vesicles' bilayers. Invasomes provided *in vitro* a significantly higher amount of incorporated cyclosporine A and temoporfin in the deeper layers of human skin (viable epidermis and dermis) as compared to conventional liquid-state liposomes and aqueous/ethanolic drug solution (Dragicevic-Curic et al., 2008, 2009; Verma, 2002). Invasomes loaded with cyclosporine A induced a faster visible hair regrowth in alopecia areata in the Dundee Experimental Bald Rat (DEBR) model than conventional liposomes (Verma et al., 2004). Dapsone-loaded invasomes enhanced *in vivo* in Wistar rats skin delivery of dapsone, which is used to treat mild to moderate acne, showing about 2.5-fold higher deposited drug amount in the skin compared to the drug solution (El-Nabarawi et al., 2018). Invasomes and Transfersomes have been shown to efficiently deliver the skin lightening agent phenylethyl resorcinol into the deep skin layers in high amounts and provided anti-tyrosinase activity up to 80%, being better than conventional liposomes (Amnuaikit et al., 2018). Invasomes loaded with azelaic acid exhibited the best antiacne efficacy in rats, followed by liposomes and LeciPlex (Shah et al., 2015). Isotretinoin-loaded invasomal gel targeted and delivered the drug to the pilosebaceous follicular unit in the treatment of eosinophilic pustular folliculitis (Dwivedi et al., 2017). Further, they have been shown to be more effective in *in vitro* delivery of hydrophilic compounds (carboxyfluorescein and radiolabeled mannitol) into and through human skin compared to aqueous drug solutions (Badran et al., 2009). As to the transdermal delivery by invasomes, isradipine-loaded invasomes enhanced the transdermal flux of the antihypertensive drug isradipine and showed a substantial and constant decrease in blood pressure for up to 24 hours, indicating their potential to be used for the management of hypertension (Qadri et al., 2017). Invasomes provided a 1.15 times improved bioavailability of the antihypertensive olmesartan with respect to the control formulation in Wistar rats (Kamran et al., 2016).