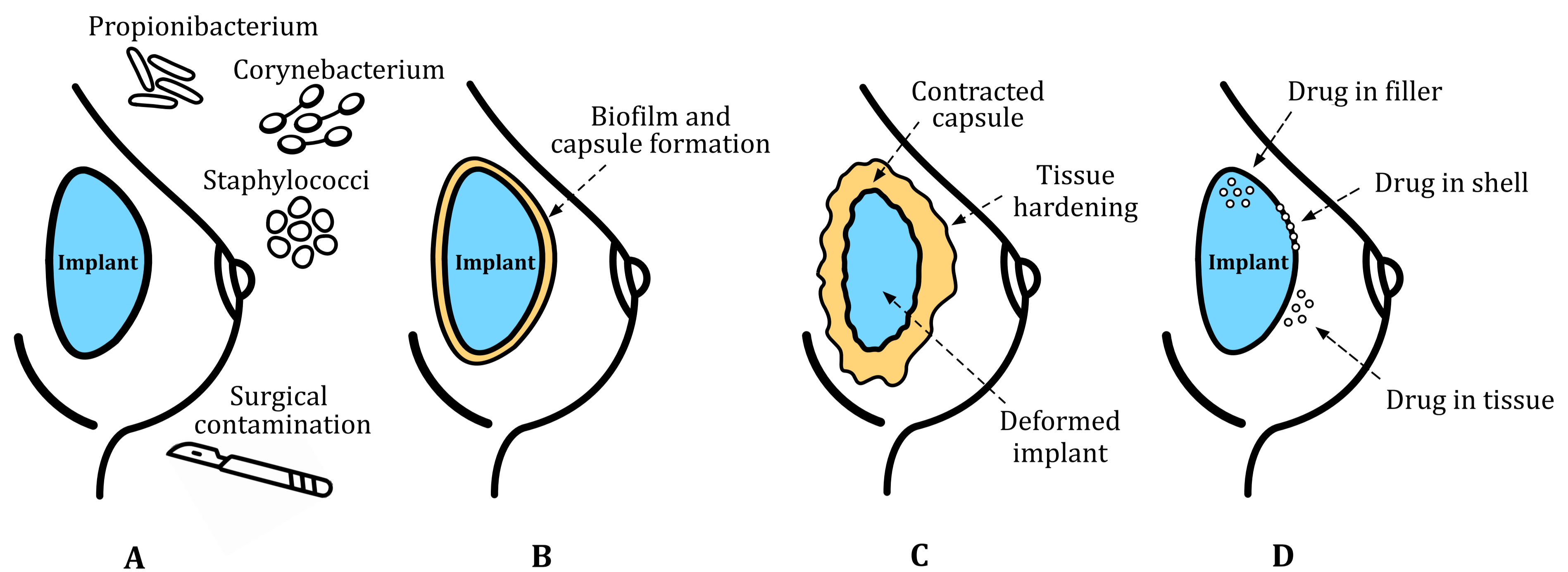


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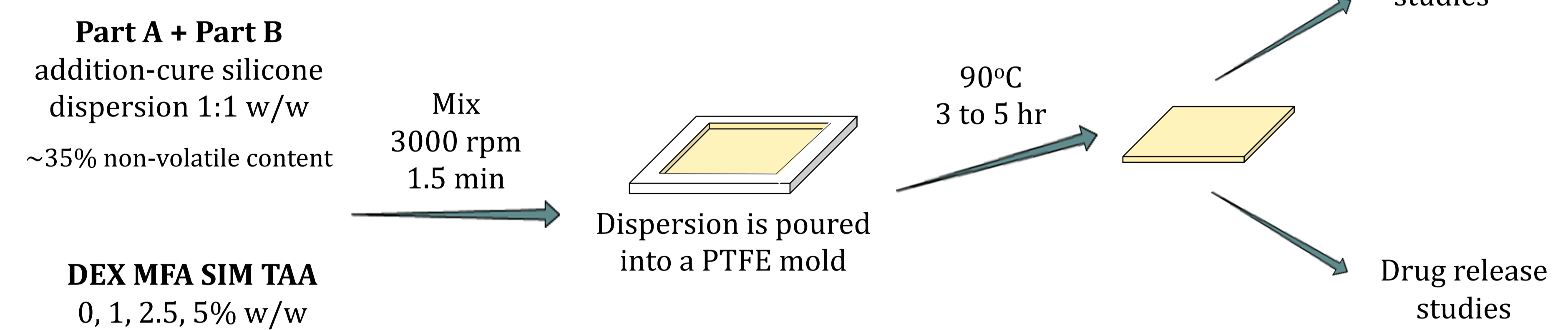
Introduction

Capsular contracture (CC) is one of the most common clinical complications associated with breast implants following breast augmentation or reconstruction surgery using implants. The foreign body reactions (FBR) – due in parts to the hydrophobicity of the silicone elastomer and bacterial adherence to the implants – are problematic and believed to lead to the development of CC. Fabrication of implants with textured surfaces has been one strategy to reduce the incidence of CC. However, while this approach has led to reduction of fibrous capsule formation around implants, it is also associated with anaphylactic large cell lymphomas. Therefore, new strategies are needed to reduce rates of CC. Orally and intravenously administered agents – such as dexamethasone (DEX), simvastatin (SIM), triamcinolone acetonide (TAA) and montelukast (MFA) – have been reported effective at reducing the formation of fibrous capsules. The incorporation and release of these drugs from the medical grade silicone materials used to manufacture breast implants, such as MED 6600, have not previously been studied. Here, we provide preliminary data supporting this strategy.

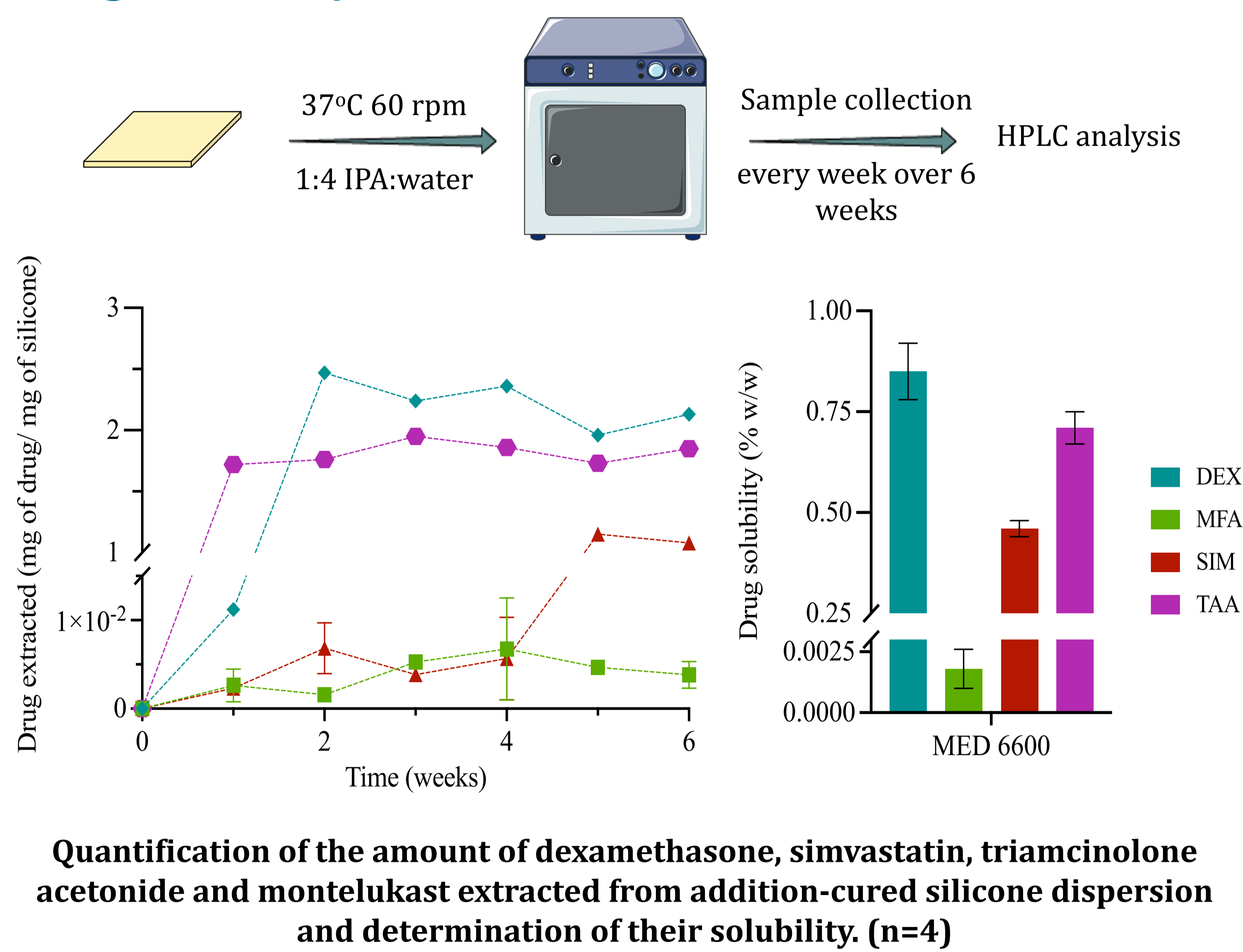


After breast surgery, bacteria are found on the implant (A), leading to the formation of a bacterial biofilm on its surface (B). This may enhance the formation of the fibrotic capsule around the implant leading to the hardening of the tissue and the deformation of the implant (C). Different pharmacological strategies can be envisioned to prevent capsular contracture (D).

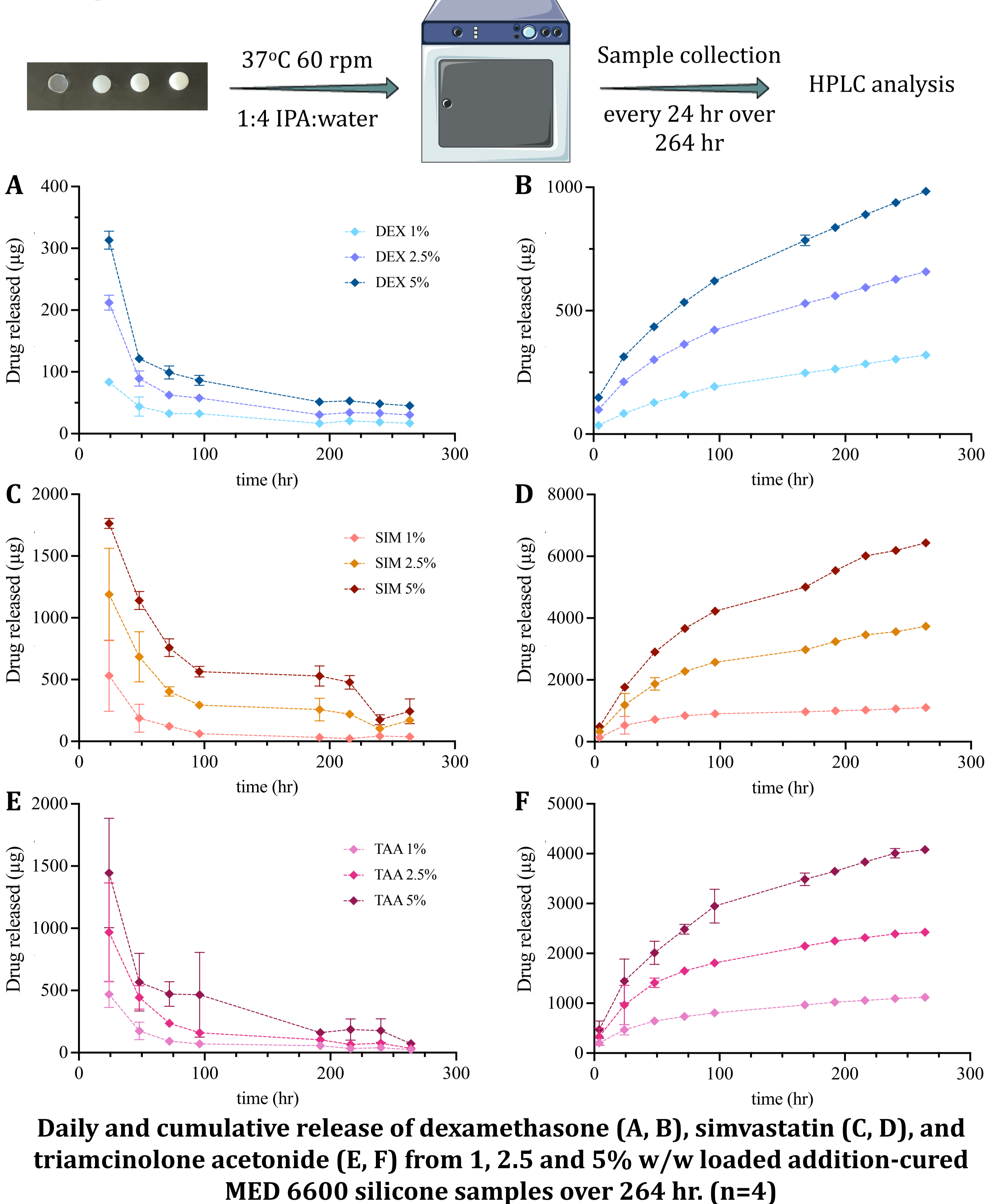
Sample preparation



Drug solubility studies



Drug release studies



Main results

- ✓ Drug solubility in cured silicone materials was < 1% w/w for all tested drugs
- ✗ MFA-loaded samples could not be prepared, due a chemical incompatibility with platinum catalyst is suspected
- ✓ Drug release rate was inversely proportional to drug solubility in silicone
- ✓ Sustained drug release was achieved. Higher loadings lead to increased release rates
- ✓ 1, 2.5, 5% w/w DEX and 5% w/w SIM **non Fickian transport**
- ✓ 1, 2.5% w/w SIM and 1, 2.5, 5% w/w TAA **Fickian transport**

Conclusions

Three drug candidates were successfully incorporated into a medical grade silicone elastomer dispersion. A slow and controlled $t^{1/2}$ release kinetic was observed. Solubility of all the candidates in the silicone material was determined.