A Science Based Approach to Overcoming Barriers to Development and Improving Patient Access to Dermatological Drug Products

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Generic Product Approval

• For product approval: PE + BE = TE

• Determination of BE is the biggest barrier towards approval of dermatological generic topical drug products

• An alternative approach needs to be developed that will assure drug product quality, safety and efficacy.

• A science based approach using SUPAC-SS principles and in vitro drug release measurement is developed (TCS) that can provide biowaiver for certain types of topical drug products.

• TCS will reduce regulatory burden without sacrificing in drug product quality and will improve patient access
Topical Drug Classification System, TCS

Q1, Q2 Same
  Q3 Same
  TCS class 1

Q1, Q2 Same
  Q3 Different
  TCS class 2

Q1, Q2 Different
  Q3 Same
  TCS class 3

Q1, Q2 Different
  Q3 Different
  TCS class 4

Topical Drug Classification System (TCS)

- **TCS** is a framework for classifying topical drug products based on its qualitative and quantitative composition, microstructure arrangements of matter and *in vitro* release (IVR).
- **TCS** is a classification system of topical drug products, which when applied will help in approval of generic topical drug products, without conducting *in vivo* studies, but assuring product efficacy.
- It is a drug development tool to justify ‘biowaiver’ in conjunction with the *in vitro* drug release of the topical dosage form.
Topical Drug Classification System (TCS)

- **TCS** is based on established scientific principles specifically developed for semisolid topical products (**SUPAC-SS**) and is combined with the **IVR** of the drug product.

- **TCS** considers the qualitative (**Q1**) and quantitative (**Q2**) composition, the role of inactive ingredients and microstructure arrangement of topical semisolid products (**Q3**).

- **Q3 → IVRT.**
Topical Drug Classification System - TCS

• Based on composition (Q1 and Q2) and IVR properties, the topical drug products are classified as TCS class 1, 2, 3 and 4.

• Under the proposed classification:
  - Only TCS class 1 and TCS class 3 drug products are eligible for biowaiver;
  - TCS class 2 and TCS class 4, are not eligible for biowaiver and will require in vivo BE studies for drug approval;
  - The nature and type of in vivo BE study will depend on the therapeutic class and dosage form category.
Topical Drug Classification System, TCS

Q1, Q2 Same
Q3 Same
TCS class 1

Q1, Q2 Same
Q3 Different
TCS class 2

Q1, Q2 Different
Q3 Same
TCS class 3

Q1, Q2 Different
Q3 Different
TCS class 4

Topical Drug Classification System - TCS

Biowaiver
• TCS Class 1:
  Q1, Q2 and Q3 same → IVR
• TCS Class 3:
  Q1 and Q2 different, Q3 same → IVR
  - May require additional in vitro studies
    (e.g., particle size, pH, globule size, rheology)
  - Excipient evaluation

Bioequivalence Study
• TCS Class 2:
  Q1, Q2 same but Q3 different → BE studies
• TCS Class 4:
  Q1, Q2, Q3 different → BE studies
Acyclovir Cream
Current Study Findings

• 21 generic products and 6 RLD (from Europe, US) were analyzed.

Findings indicate that:
• The formulations (excipients/composition) are markedly different, the *in vitro* release and microstructure, rheology are all different.
• A good relationship was observed in these studies between microstructure (Q3) (rheology) and *in vitro* release.
• Changes in microstructure reflected in different release rate.  Q3  →  IVRT
Conclusion

• A practical and science based classification system, TCS, for topical drug products is proposed.

• TCS will facilitate:
  - Generic product development, reduce the regulatory burden and assure product quality across all therapeutic classes.
  - Availability of topical drug products to patients and consumers at a more reasonable cost.
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Thank you for your Attention