

Safety and Anti-HIV Activity of Over-the- Counter Lubricant Gels

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Overview

- Rationale for investigating lubricants.
- What we know about lubricants; safety and anti-HIV activity.
- Our testing approach and results.



Lubricant history

- Personal lubricants were created from surgical lubricants.
- US FDA deemed them medical devices 1976.
- Lubricants have been used as “placebos” for microbicide clinical trials.
- Lubricant use is common in developed countries.



Safety and anti-HIV activity

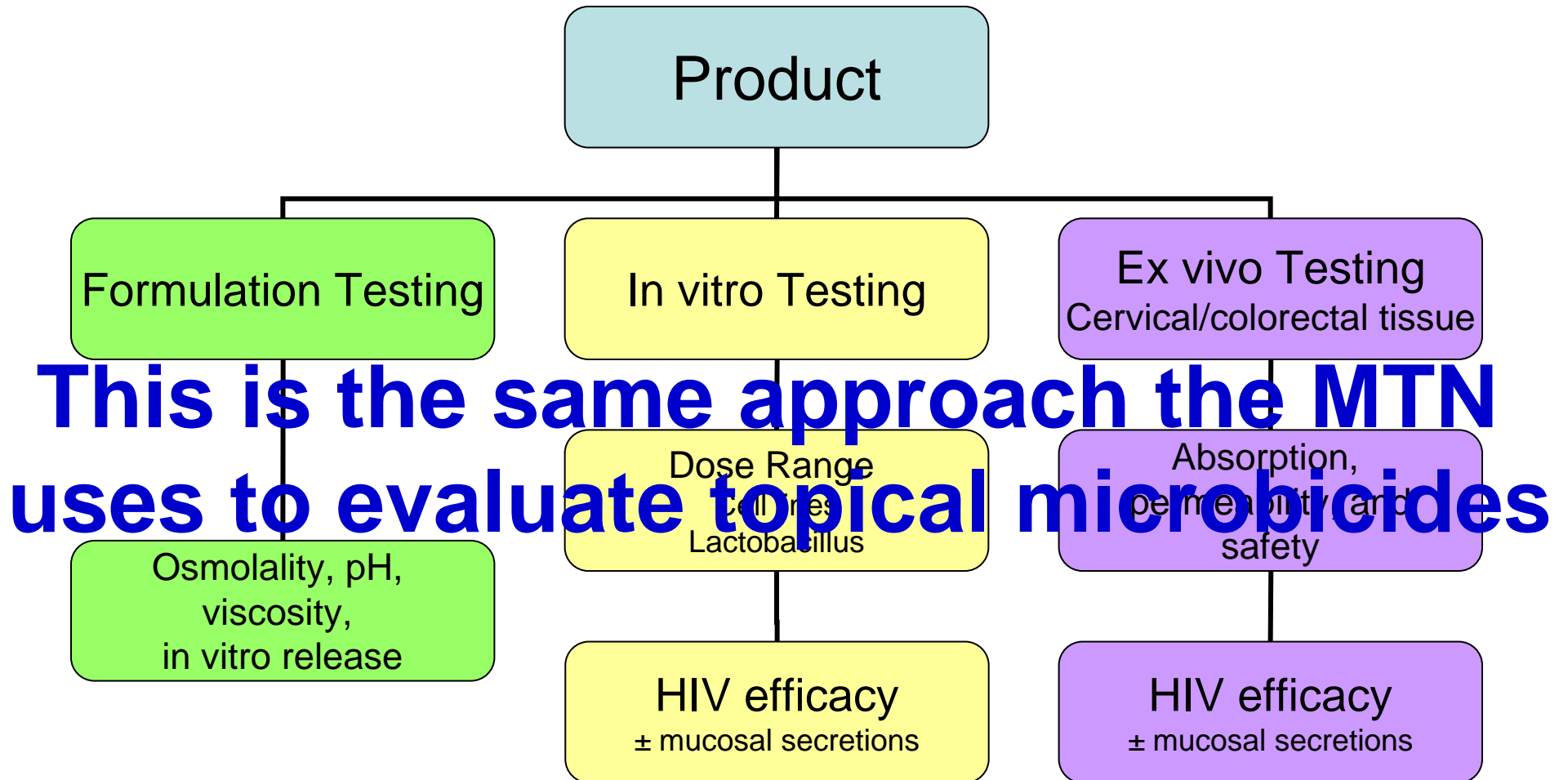
- Lubricants impede sperm mobility
 - Anderson L., et al. Hum Reprod 13:3351, 1998
 - Agarwal A., et al. Fert Ster 89:375, 2008
- Lubricants were shown to be toxic to vaginal tracts of mice and enhance susceptibility to HSV
 - Maguire, R.A., et al. STD 28:259, 2001
 - Sudol, K.M. and Phillips, D.M. STD 31:346, 2004
- Hyperosmolar lubricants increased irritation and damage in a slug mucosal irritation assay
 - Adriaens and Remon, STD 35:512, 2008
- Lubricant excipients, glycerin and polyquaternium-32, showed anti-HIV activity; however, no cellular toxicity determined
 - Baron S., et al. ARHR 17:997, 2001
 - Nguyen S., et al. J Biol Regul Homeost Agents 18:268, 2004

IRMA survey

- International Rectal Microbicide Advocates www.rectalmicrobicides.org
- 29-week web-based survey (6 languages) on lubricants used during anal sex
- Which lubricants were used the most for anal sex

Combined
Astroglide*
Durex*
Elbow Grease
Gun Oil
ID*
K-Y*
Liquid Silk
Pjur Eros
spit
Swiss Navy
Vaseline
Wet*

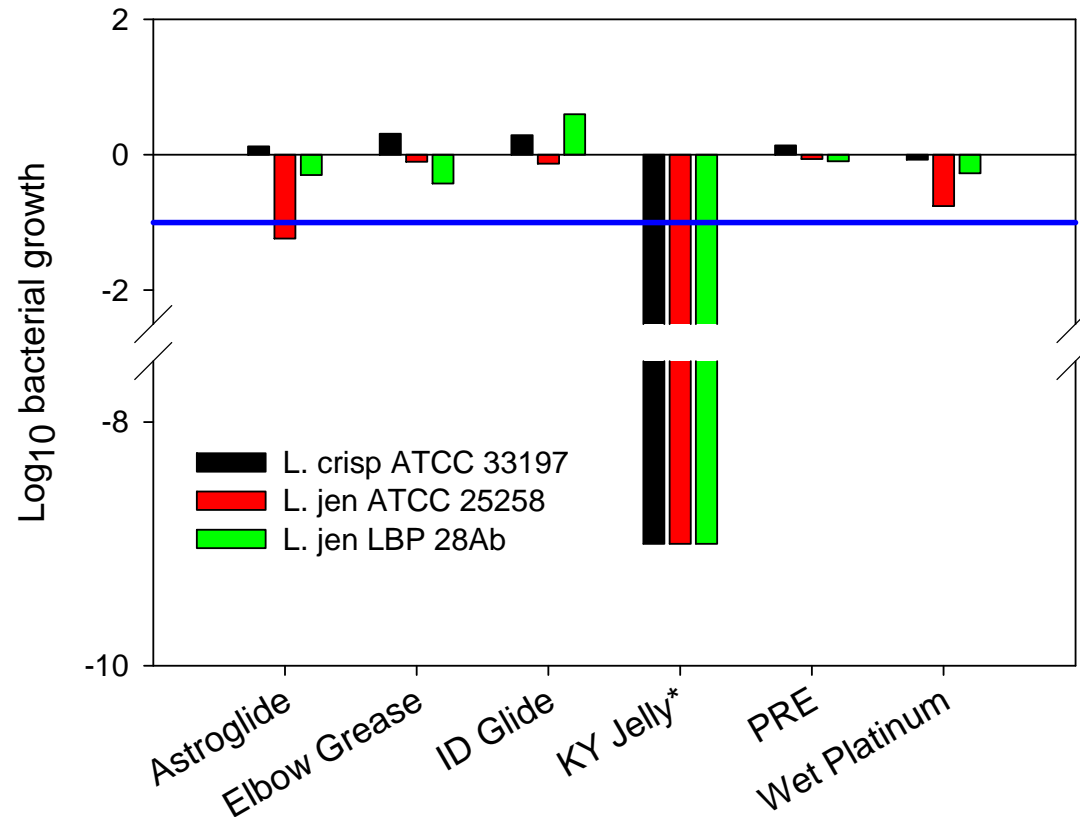
Our approach



Formulation characteristics

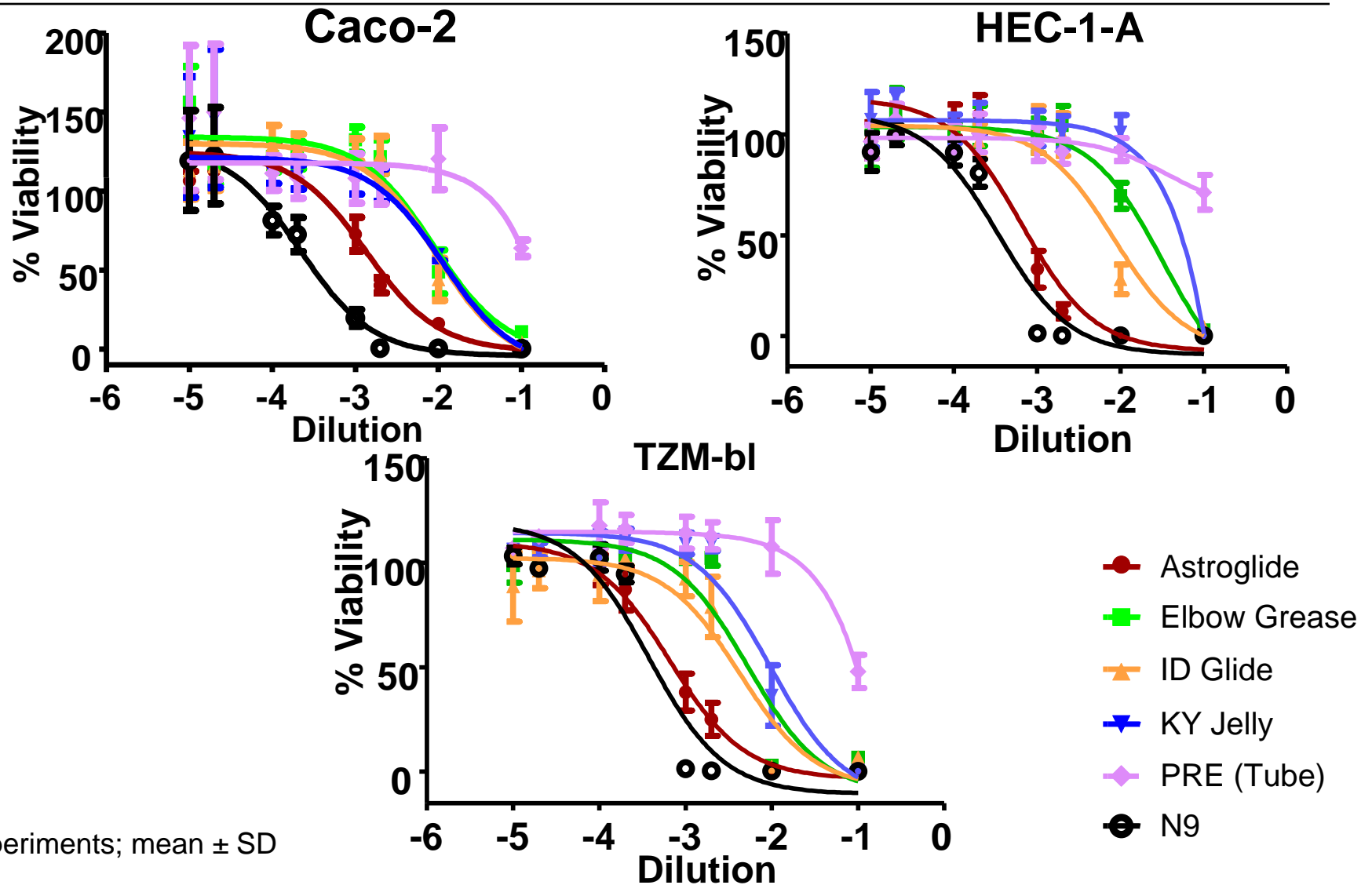
Lubricant	Osmolality (mmol/kg)	pH	Viscosity (cps, 10 rpm @ 25°C)
Semen	321	8.1	4
PRÉ	502	7.3	1683
KY Jelly	2510	4.5	5913
ID Glide	3150	5.2	751
Elbow Grease	3865	5.7	3159
Astroglide	6113	4.0	207
Gynol II (N9)	1245	4.7	1248
Wet Platinum	NA	NA	145

Toxicity testing – vaginal flora



*KY Jelly contains chlorhexidine which is bactericidal to gram-positive and gram-negative bacteria

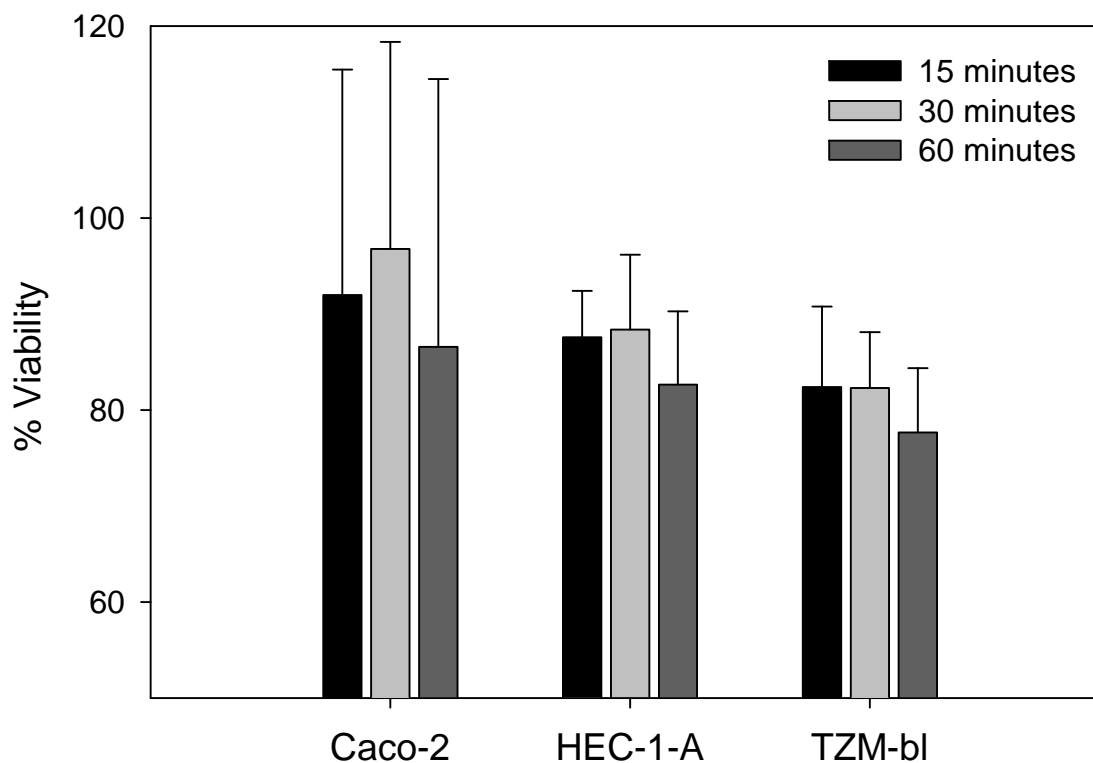
Toxicity testing – epithelial cells



4 experiments; mean \pm SD

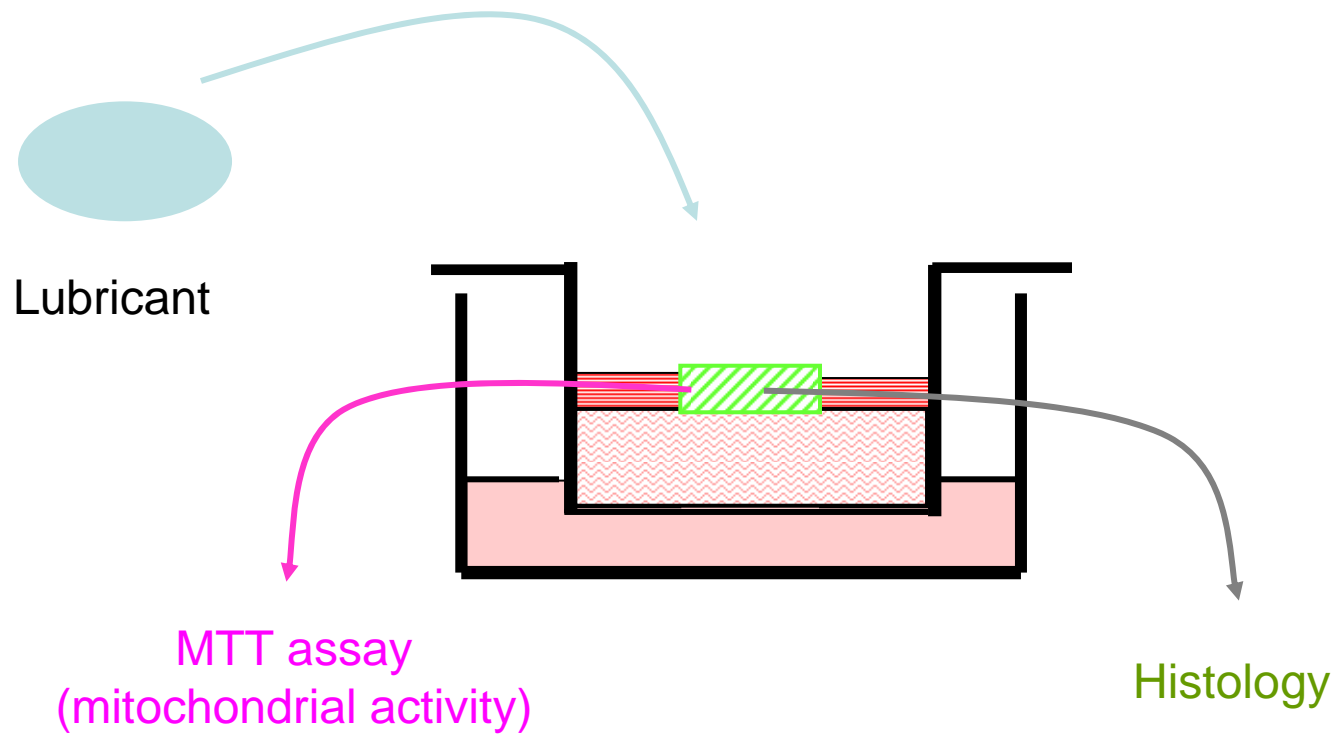
Toxicity testing – epithelial cells

Wet Platinum



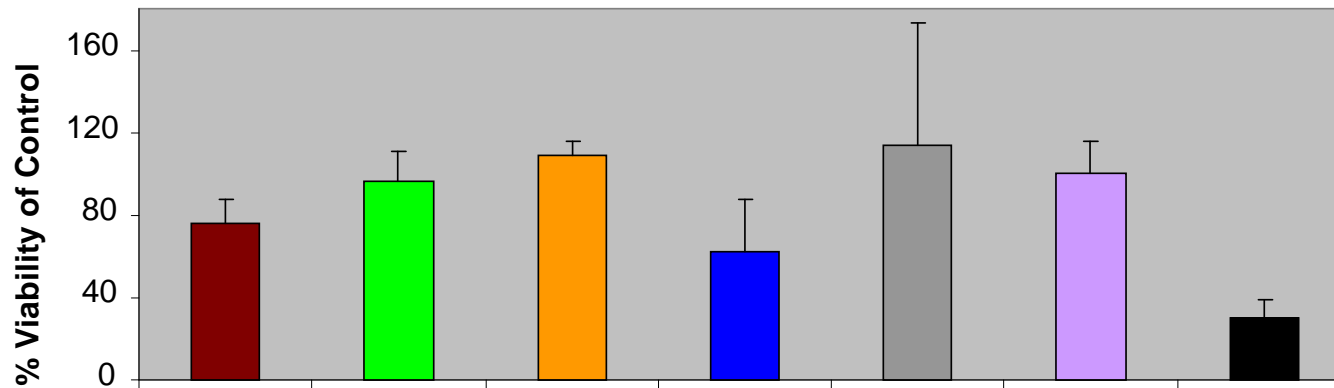
6 experiments; mean \pm SD

Toxicity testing – explant tissue

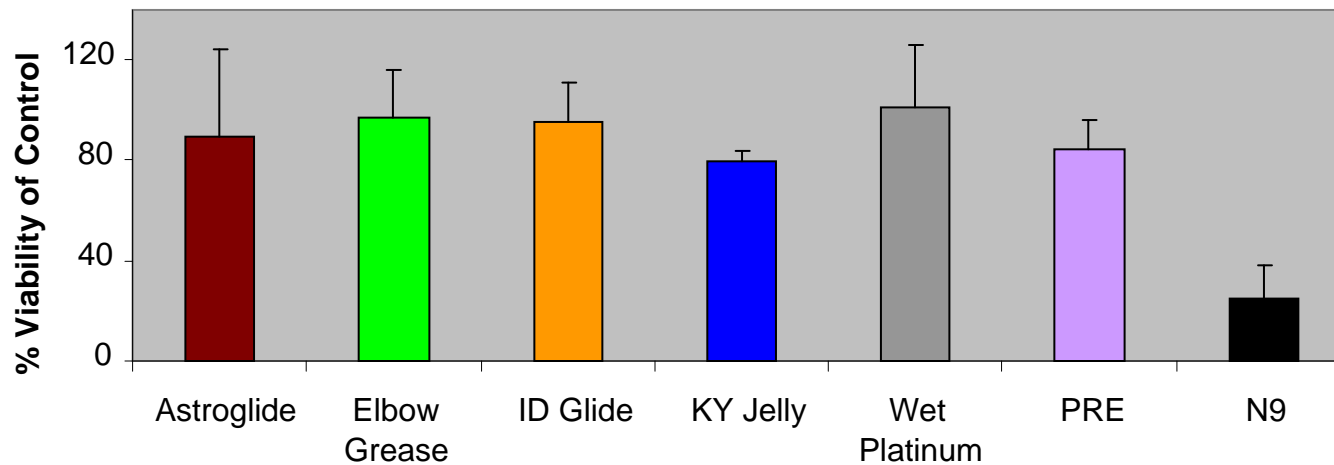


Explant viability – MTT assay

Colorectal explant viability

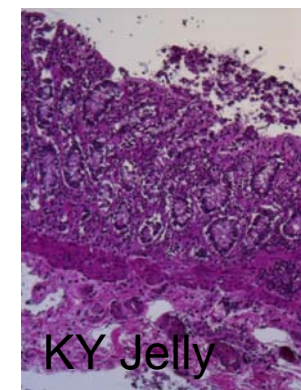
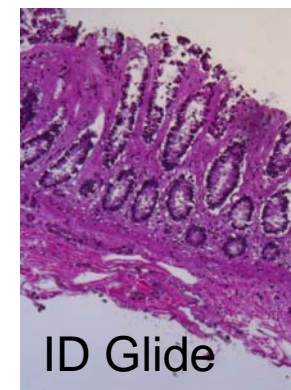
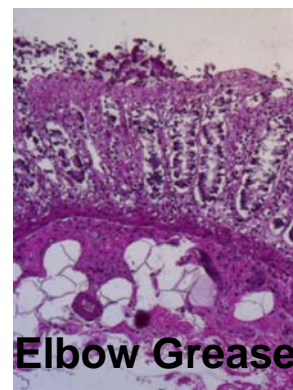
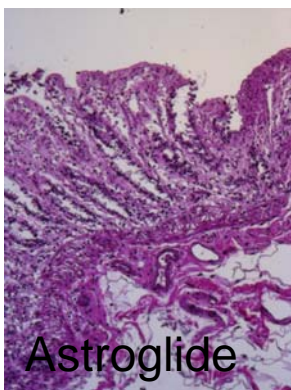
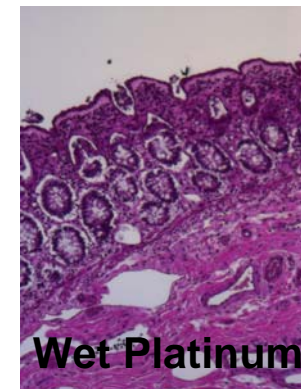
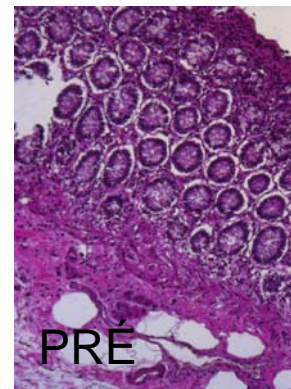
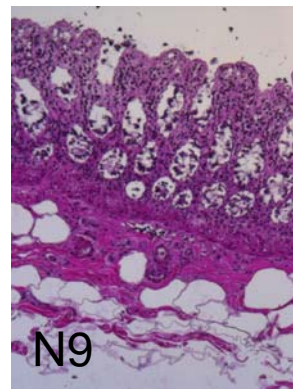
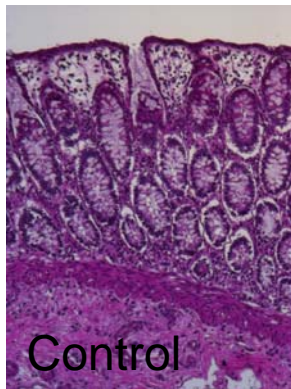


Ectocervical explant viability



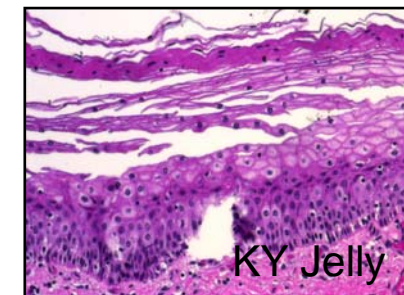
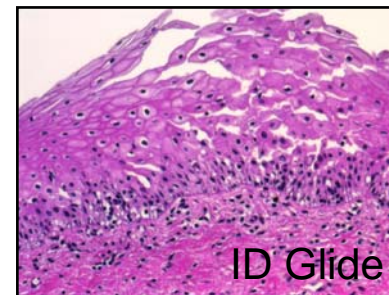
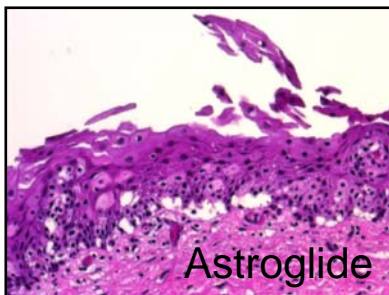
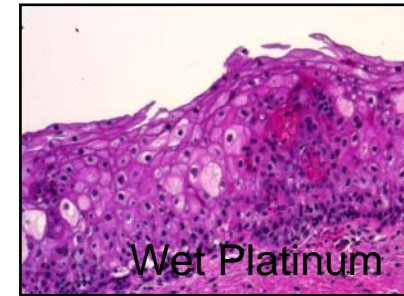
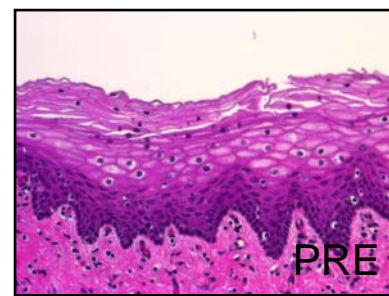
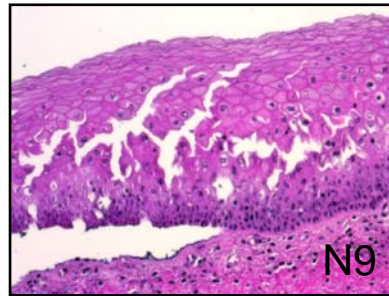
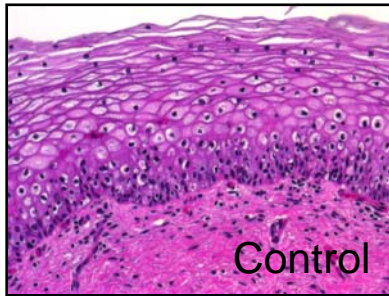
Explant viability – Histology

Colorectal tissue

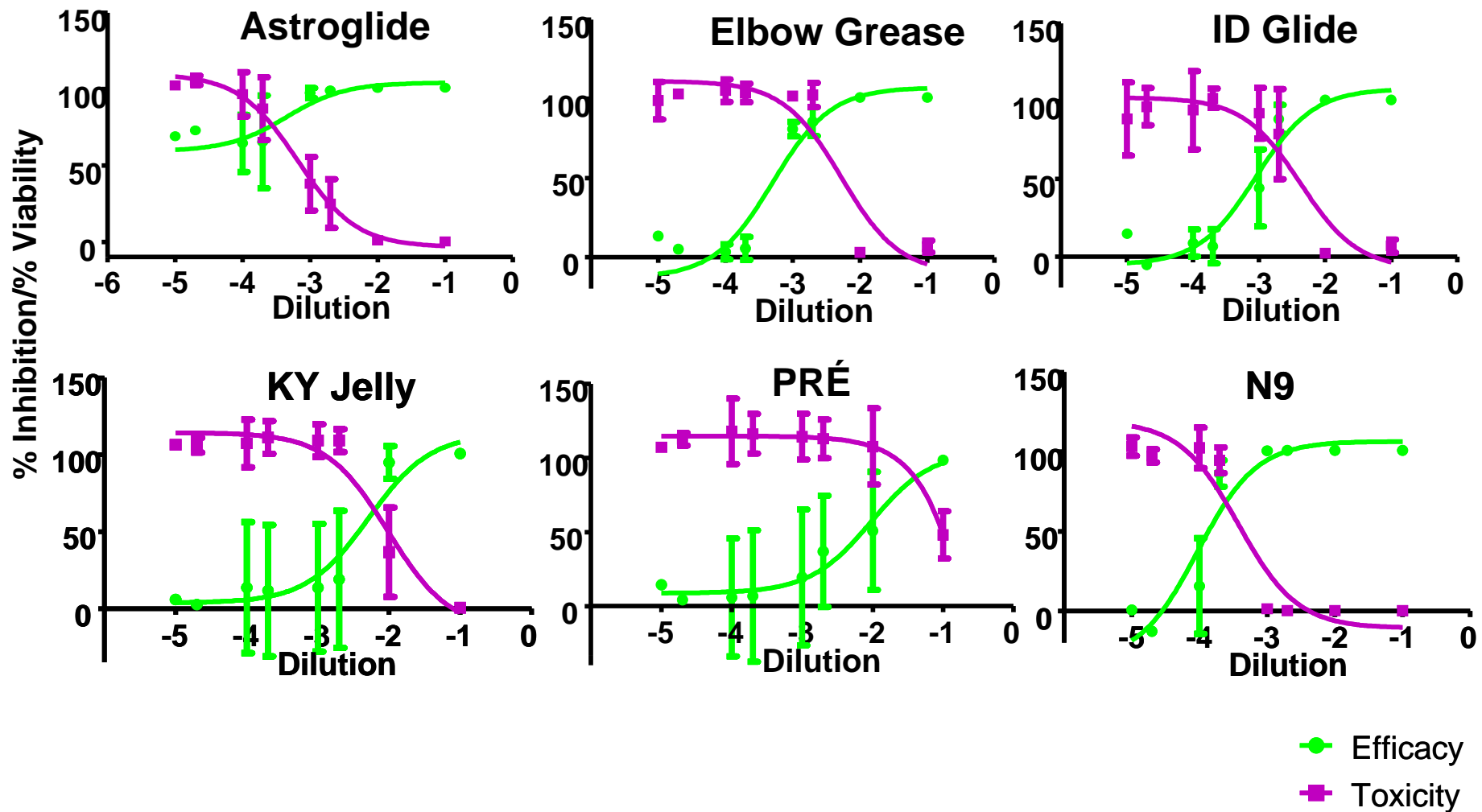


Explant viability – Histology

Ectocervical tissue



Anti-HIV activity – TZM-bl assay



Therapeutic index (TI)

- TI is the lethal dose of a drug for 50% of the population (LD50) divided by the minimum effective dose for 50% of the population (ED50)
- The higher the number, the more likely you will see efficacy without toxicity – should exceed 100

Astroglide	Elbow Grease	ID Glide	KY Jelly	PRÉ	N9
1.5	10	5	2	15	4



Summary

- KY Jelly is toxic to lactobacilli
- Elbow Grease, ID Glide, and KY Jelly have similar toxicity profiles for cells, cell lines, and tissues
- Astroglide is the most toxic
- PRÉ and Wet Platinum appear safest
- None of the lubricants have anti-HIV activity



Conclusion

- The in vitro toxicity of the hyperosmolar lubricants suggests that they may cause damage to mucosal surfaces in people.
- This may lead to increased susceptibility to HIV.
- **So...choose your lube carefully!**
 - **Make it isosmolar and condom friendly!**

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