



Assessing Batch-to-Batch Variability in hMG Products: A Comparative Analysis of MENOPUR®, MERIOFERT® and HUMOG-HP®

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OBJECTIVE

To characterise and compare the composition of MENOPUR®, MERIOFERT® and HUMOG-HP®

KEY TAKEAWAYS

1 MENOPUR®, MERIOFERT® and HUMOG-HP® derive their luteinising activity primarily from hCG

2 MENOPUR® demonstrated a more consistent and uniform FSH, hCG and LH composition than MERIOFERT® or HUMOG-HP®

3 Further studies are warranted to assess whether better batch-to-batch consistency translates into more predictable clinical outcomes for patients undergoing fertility treatment

BACKGROUND

- MENOPUR®, MERIOFERT®, and HUMOG-HP® are highly-purified urinary-derived human menopausal gonadotrophins (hMG), containing follicle-stimulating hormone (FSH), luteinising hormone (LH), and human chorionic gonadotrophin (hCG)
- LH and hCG act on the same receptor, however their structural differences provide hCG with a longer half-life and greater bioactivity compared to LH¹⁻³
- Manufacturing differences may influence the FSH, hCG and LH composition required to deliver the 1:1 ratio of FSH:LH bioactivity in the final product, which could affect predictability of clinical outcomes

METHODS

- Three batches each of MENOPUR® (Ferring Pharmaceuticals, Switzerland) and MERIOFERT® (Institut Biochimique SA, Switzerland) and two batches of HUMOG-HP® (Bharat Serums and Vaccines Ltd, India) were analysed for batch-to-batch variability
- Immunocontent was measured using enzyme linked fluorescent assay (ELFA) from bioMérieux. For comparison of FSH, hCG and LH immunocontent values were normalised to 75 IU bioactivity
- Size exclusion chromatography (SEC) was performed using a silica-based column with UV at 210 nm detection. Samples were reconstituted and/or diluted to the same bioactivity concentration (IU/ml) for comparative area under the curve (AUC) analysis

RESULTS

Table 1 FSH, hCG, and LH Immunocontent of MENOPUR®, MERIOFERT® and HUMOG-HP®

	Product	Batch	Immunocontent IU/75 IU bioactivity	Average (intra-product %RSD)
MENOPUR®				
FSH	75 IU	X10001G	60.0	62.6 (5.5)
	75 IU	X12847	66.6	
	1200 IU pen	X00076	61.3	
hCG	75 IU	X10001G	12.4	12.2 (6.3)
	75 IU	X12847	12.9	
	1200 IU pen	X00076	11.4	
LH	75 IU	X10001G	0.3	0.2 (16.9)
	75 IU	X12847	0.2	
	1200 IU pen	X00076	0.2	
MERIOFERT®				
FSH	150 IU	C08203	65.0	88.2 (23.5)
	900 IU	D00411	95.1	
	900 IU	D15647	104.7	
hCG	150 IU	C08203	8.6	10.3 (35.6)
	900 IU	D00411	7.8	
	900 IU	D15647	14.5	
LH	150 IU	C08203	0.1	0.2 (49.1)
	900 IU	D00411	0.3	
	900 IU	D15647	0.3	
HUMOG-HP®				
FSH	150 IU	B14223006	57.8	78.6 (37.5)
	1200 IU	V657009	99.4	
hCG	150 IU	B14223006	8.5	11.8 (40.0)
	1200 IU	V657009	15.1	
LH	150 IU	B14223006	4.6	4.0 (23.2)
	1200 IU	V657009	3.3	

The table includes individual batch values (n=4, two sample preparations and two determinations) average content per product, and relative intra-product variation for each batch available at the time of testing. All data have been normalized to 75 IU bioactivity derived from the label claim. MENOPUR 75 IU, MERIOFERT 150 IU and HUMOG 150 IU were reconstituted in 0.9% NaCl; MERIOFERT 900 IU was reconstituted in the supplied solvent; and MENOPUR 1200 IU Pen and HUMOG 1200 IU vial were used as provided (liquid formulation).

- The immunocontent data confirmed that luteinising activity in both MENOPUR® and MERIOFERT® is primarily attributable to hCG, whereas in HUMOG-HP®, luteinising activity is derived from both hCG and LH

Abbreviations

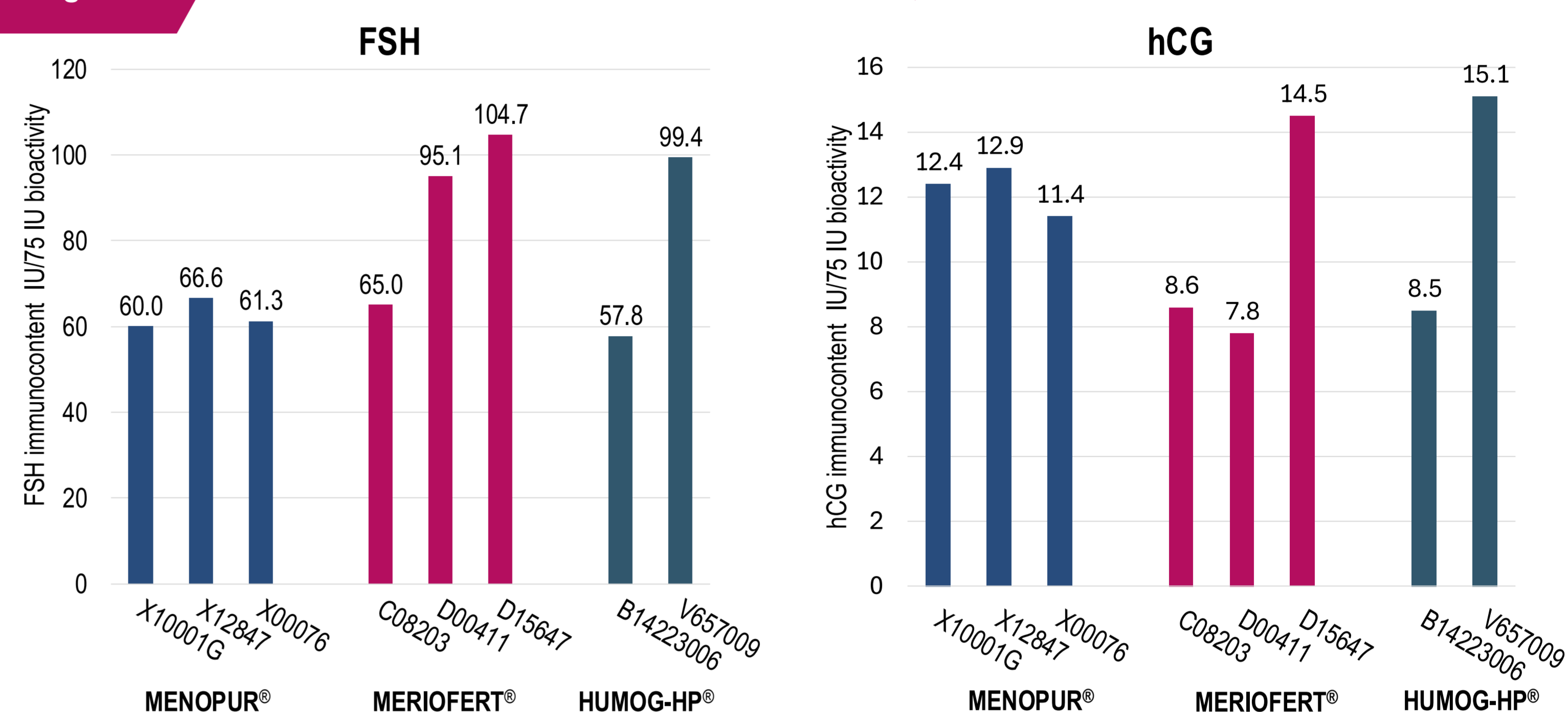
AUC, area under curve; FSH, follicle-stimulating hormone; hCG, human chorionic gonadotrophin; hMG, human menopausal gonadotrophins; HP, highly purified; IU, international units; LH, luteinising hormone; mAU, milli-absorbance units; RSD, relative standard deviation; SEC, size exclusion chromatography; UV, ultraviolet

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Figure 1

FSH and hCG Immunocontent in MENOPUR®, MERIOFERT® and HUMOG-HP®



Bar graphs show individual batch values for FSH and hCG immunocontent, normalized to 75 IU bioactivity. MERIOFERT® and HUMOG-HP® exhibited greater variability in both FSH and hCG content across batches compared to MENOPUR®, which maintained a more consistent profile. Data are derived from Table 1.

- HUMOG-HP® and MERIOFERT® exhibited batch-to-batch variability in immunological hCG and FSH content, exceeding 20%, while MENOPUR® showed lower variability (<10%)

Table 2

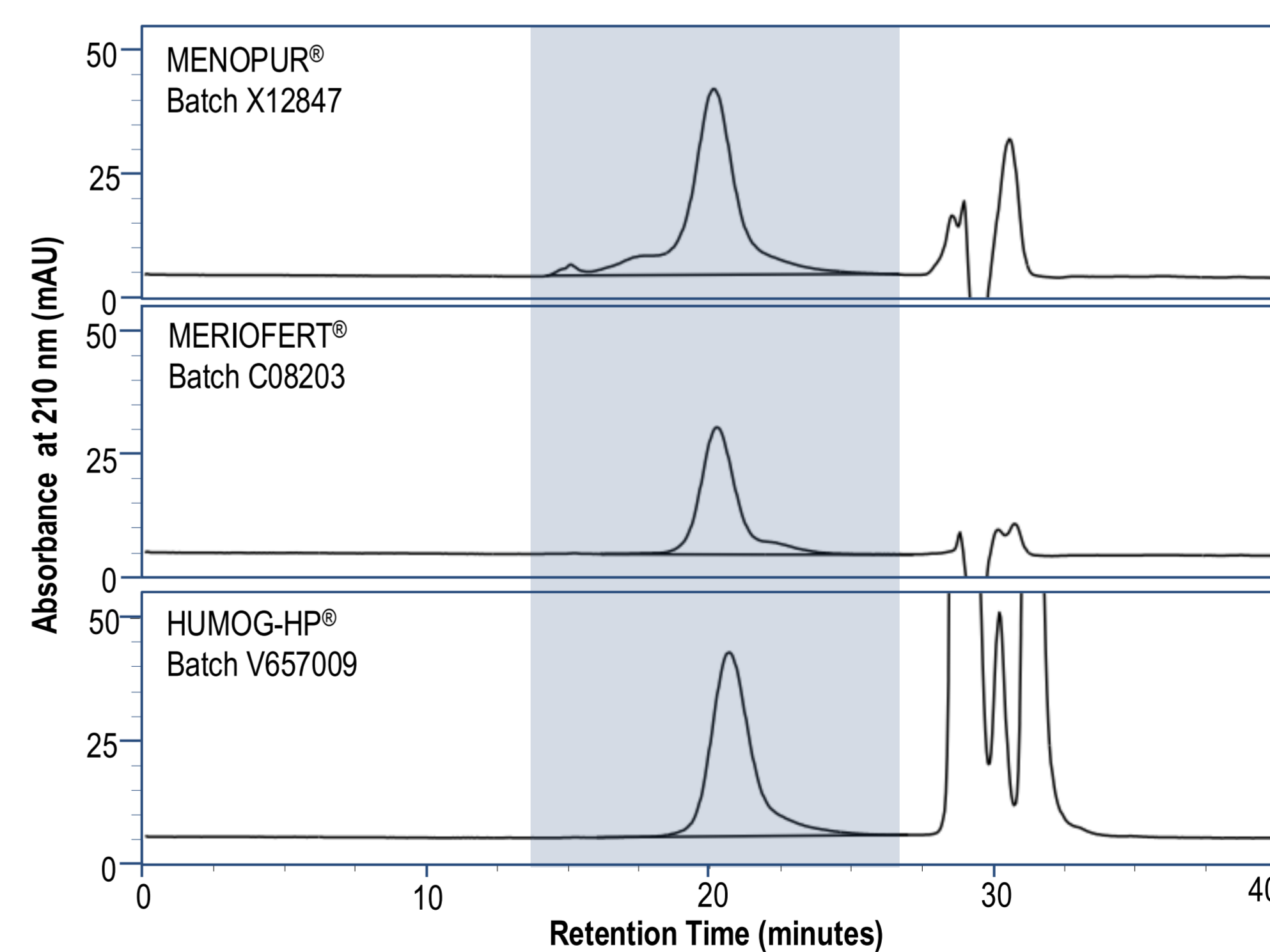
Size Exclusion Chromatography Analysis

	Product	Batch	AUC (SEC) Injection 15 IU	Average (intra-product %RSD)
MENOPUR®	75 IU	X10001G	83.4	81.4 (2.8)
	75 IU	X12847	78.9	
	1200 IU pen	X00076	82.0	
MERIOFERT®	150 IU	C08203	40.1	56.3 (25.4)
	900 IU	D00411	61.5	
	900 IU	D15647	67.2	
HUMOG-HP®	1200 IU	V657009	65.9	56.2 (24.6)
	150 IU	B14223006	46.4	

AUC values for the hMG-HP main peak are shown for 3 batches of MENOPUR® and MERIOFERT® and 2 batches of HUMOG-HP® that were available at the time of testing. Samples were reconstituted and/or diluted to the same bioactivity concentration (IU/mL) for comparative analysis. The table includes individual batch AUCs, average AUC per product, and relative intra-product variation (%RSD).

Figure 2

Representative Size Exclusion Chromatograms



The hMG-HP peak area used for AUC determination is highlighted in blue.

- MERIOFERT® and HUMOG-HP® revealed intra-product variability in the hMG-HP AUC, whereas MENOPUR® displayed a more consistent AUC profile, reinforcing its uniformity across batches

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Author disclosures

KK, MH, DC and SO are employees of Ferring Pharmaceuticals A/S. NM has no conflicts of interest.

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