# CENTER FOR DRUG EVALUATION AND RESEARCH

APPLICATION NUMBER: 022544Orig1s000

**CHEMISTRY REVIEW(S)** 





# NDA 22-544

# Gralise (Gabapentin) Tablet

**Abbott Products, Inc** 

Yong Hu, Ph.D.

Office of New Drug Quality Assessment

For

**Division of Anesthesia and Analgesia Products** 





# **Table of Contents**

Cl	hemistry Review Data Sheet	3
Tł	he Executive Summary	7
I.	Recommendations	7
	A. Recommendation and Conclusion on Approvability	7
	B. Recommendation on Phase 4 (Post-Marketing) Commitments, Agreements, and/or Risk Management Steps, if Approvable	7
II.	Summary of Chemistry Assessments	7
	A. Description of the Drug Product(s) and Drug Substance(s)	7
	B. Description of How the Drug Product is Intended to be Used	9
	C. Basis for Approvability or Not-Approval Recommendation	10
III.	. Administrative	10
	A. Reviewer's Signature	10
	B. Endorsement Block	10
	C. CC Block	10
Cl	hemistry Assessment	11
I.	Review Of Common Technical Document-Quality (Ctd-Q) Module 3.2: Body Of Data.	11
	R REGIONAL INFORMATION	23
II.	Review Of Common Technical Document-Quality (Ctd-Q) Module 1	24
	A. Labeling & Package Insert	24
III.	. List of Comments To Be Communicated	24

# C DEN

# **CHEMISTRY REVIEW**



Chemistry Review Data Sheet

# **Chemistry Review Data Sheet**

1. NDA: 22-544

2. REVIEW #: 2

3. REVIEW DATE: 13-Jan-2011

4. REVIEWER: Yong Hu, Ph.D.

5. PREVIOUS DOCUMENTS:

Previous DocumentsDocument DateCMC Review #103-Dec-2010Biopharmaceutics Review #122-Nov-2010

6. SUBMISSION(S) BEING REVIEWED:

Submission(s) ReviewedDocument DateQuality/Response to Information Request07-Dec-2010Quality/Response to Information Request29-Dec-2010Quality/Response to Information Request11-Jan-2011

7. NAME & ADDRESS OF APPLICANT:

Name: Abbott Products, Inc

Address: 901 Sawyer Road, Marietta, GA 30062

Representative: Michael F. Hare, Asst. Dir

Telephone: 770-578-5620

## 8. DRUG PRODUCT NAME/CODE/TYPE:

a) Proprietary Name: Gralise Tablet

- b) Non-Proprietary Name (USAN): Gabapentin Tablet
- c) Code Name/# (ONDC only): DM-1796
- d) Chem. Type/Submission Priority (ONDC only):
  - Chem. Type: 3

Reference ID: 2891128

• Submission Priority: S

# C DER

## **CHEMISTRY REVIEW**



Chemistry Review Data Sheet

## 9. LEGAL BASIS FOR SUBMISSION:

505 b(2); The reference drug is the immediate-release product Neurontin (NDAs 20-129, 20-235, 20-882, 21-397, 21-423, and 21-424) from Pfizer.

## 10. PHARMACOL. CATEGORY and INDICATION:

Anticonvulsant/Analgesic; Treatment of postherpetic neuralgia (PHN).

11. DOSAGE FORM:

**Tablet** 

12. STRENGTH/POTENCY:

300 and 600 mg

13. ROUTE OF ADMINISTRATION:

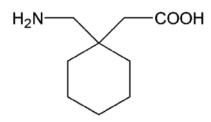
Oral

- 14. Rx/OTC DISPENSED: <u>x</u> Rx OTC
- 15. SPOTS (SPECIAL PRODUCTS ON-LINE TRACKING SYSTEM):

\_\_\_\_SPOTS product Form Completed

\_\_\_x \_\_Not a SPOTS product

16. CHEMICAL NAME, STRUCTURAL FORMULA, MOLECULAR FORMULA, MOLECULAR WEIGHT:



Chemical name: 1-(Aminomethyl)cyclohexaneacetic acid

Molecular formula: C9H17NO2 Molecular Weight: 171.24

17. RELATED/SUPPORTING DOCUMENTS:

A. DMFs:





# Chemistry Review Data Sheet

DMF #	ТҮРЕ	HOLDER	ITEM REFERENCED	CODE <sup>1</sup>	STATUS <sup>2</sup>	DATE REVIEW COMPLETED	COMMENTS
(b) (4	II	(b) (4)	Gabapentin drug substance	3	Adequate	21-Jun-2010	
	II		Gabapentin drug substance	1	Adequate	22-Nov-2010	
	IV		Hypromellose (b) (4)	4	N/A		
	IV		Microcrystalline cellulose (b) (4)	4	N/A		
	IV		Polyethylene oxide (b) (4)	4	N/A		
	IV		Opadry II white and beige	4	N/A		
	III		(b) (4)	4	N/A		
	III			4	N/A		
	III			4	N/A		
	III			4	N/A		
	IV			4	N/A		

<sup>&</sup>lt;sup>1</sup> Action codes for DMF Table:

1 – DMF Reviewed.

Other codes indicate why the DMF was not reviewed, as follows:

- 2 Type 1 DMF
- 3 Reviewed previously and no revision since last review
- 4 Sufficient information in application
- 5 Authority to reference not granted
- 6 DMF not available
- 7 Other (explain under "Comments")

## **B.** Other Documents:

DOCUMENT	APPLICATION NUMBER	DESCRIPTION
IND	71,439	Gabapentin tablet sponsored by the applicant.

<sup>&</sup>lt;sup>2</sup> Adequate, Inadequate, or N/A (There is enough data in the application, therefore the DMF did not need to be reviewed)





# Chemistry Review Data Sheet

# 18. STATUS:

Reference ID: 2891128

CONSULTS/ CMC RELATED REVIEWS	RECOMMENDATION	DATE	REVIEWER
Biometrics	Not requested.		
EES	Acceptable.	26-May-2010	A. Inyard
Pharm/Tox	(b) (4)	30-Nov-2010	Armaghan Emami
	in the drug product is acceptable,	(wrap-up meeting)	
	based on the specification of		
	Neurontin, the approved referenced		
	product.		
Biopharm	The IVIVC model is not	30-Nov-2010	Sandra Suarez
	acceptable. The drug product	(Wrap-up meeting)	
	should not be designated as an		
	extended-release product taking	Biopharm review	
	into account the higher plasma	(dated 22-Nov-	
	concentration fluctuation index	2010; signed off on	
	compared to Neurontin IR. The	03-Dec-2010)	
	addition of a drug product		
	manufacturing site post approval		
	(subject of the compatibility		
	protocol submitted) may require a		
	bioequivalence study due to lack of		
	IVIVC.		
LNC	N/A		
Methods Validation	Not requested for the conventional methods.		
OPDRA	N/A		
EA	Categorical exclusion acceptable.	03-Dec-2010	Yong Hu
Microbiology	N/A. Oral tablet.		



**Executive Summary Section** 

# The Chemistry Review for NDA 22-544

# The Executive Summary

## I. Recommendations

# A. Recommendation and Conclusion on Approvability

The NDA can be approved from CMC perspective.

The following comment should be communicated to the applicant in the Action Letter.

- O The comparability protocol to support an alternate drug product manufacturer is insufficient. Addition of a drug product manufacturing site may require a bioequivalence study. You may discuss with the Agency and submit the alternate drug product manufacturing site and supporting data post-approval.
- B. Recommendation on Phase 4 (Post-Marketing) Commitments, Agreements, and/or Risk Management Steps, if Approvable

None.

Reference ID: 2891128

# II. Summary of Chemistry Assessments

# A. Description of the Drug Product(s) and Drug Substance(s)

The product is claimed to be an extended-release tablet, 300 and 600 mg, referred to by the applicant as G-ER. However, the Biopharmaceutics team recommends that the product should not be designated as an extended-release product based on the plasma concentration fluctuation index; (see the Biopharmaceutics review dated 22-Nov-2010 and signed off on 03-Dec-2010). Therefore, the drug product is to be designated as gabapentin tablet, with a "once-daily" dosing regimen. The tablets are intended for oral administration in the treatment of postherpetic neuralgia in adults at a dose of up to 1800 mg once-daily. The tablets are targeted to deliver approximately 90% of the total daily dose of gabapentin over approximately a 10 hour period to the upper gastrointestinal (GI) tract, where the drug is claimed to be most efficiently absorbed. Gastric retention of the tablets is said to be critical to delivering the drug to the upper GI tract over an extended period. Tablet swelling in gastric fluid and administration of the tablet with food are both necessary for gastric retention of the tablet. The "extended drug release" is claimed to be achieved by the diffusional control of the drug in the matrix of the polymers . The same polymers also control the swelling of the tablets. The tablet swelling is shown in the modified simulated gastric fluid in an in-vitro study. Regarding the safety of the swelled size, the clinical team informed that there was no evidence that the size of the swelled tablets was problematic - in the clinical trials there were no instances of obstruction or sticking. In addition, a post marketing AERs search for GI AEs including





#### **Executive Summary Section**

obstruction for similar formulations (Glumetza and Proquin XR) did not find any reports. The tablet is said to exit the stomach during Phase III of the migrating motor complex (housekeeper wave) in the fasting state and to transit through the GI tract and dissolve away. The applicant states that the same formulation technology has also been used in the approved NDA 21-744 (Proquin XR ciprofloxacin HCl) and NDA 21-748 (Glumetza ER Metformin HCl).

The 300 mg tablets are white to off-white, film-coated, 0.3937" X 0.6299" modified oval shaped tablets that are 714 mg in weight, and debossed with "SLV" on one side and with "300" on the other side.

The 600 mg tablets are beige, film-coated, 0.4330" x 0.7450" modified oval shaped tablets that are 1020 mg in weight, and debossed with "SLV" on one side and with "600" on the other side.

The 300 mg and 600 mg tablets are not compositionally proportional.

The excipients for the 300 and 600 mg tablets are polyethylene oxide, hypromellose, copovidone, magnesium stearate (b) (4), microcrystalline cellulose (300 mg), Opadry® II white (300 mg) and beige (600 mg). Opadry® II white contains polyvinyl alcohol, titanium dioxide, talc, polyethylene glycol 3350, and lecithin (soya). Opadry® II beige contains polyvinyl alcohol, titanium dioxide, talc, polyethylene glycol 3350, iron oxide yellow, and iron oxide red.

The manufacturing site for the drug product is

The manufacturing process involves

The proposed commercial manufacturing scales are about (b) (4) for 300 and 600 mg strengths, respectively. The phase 3/registration stability batches were manufactured at the proposed commercial site and ranged from (b) (4) in scale.

The Biopharmaceutics Review #1 determined that the tablet dissolution acceptance criteria and the IVIVC model were not acceptable. The applicant has since revised the tablet dissolution acceptance criteria in the product specification as requested by the Biopharmaceutics team. An in-vitro study showed that the drug release was decreased with increasing concentration of alcohol in the dissolution medium, suggesting a low risk of dose dumping in the presence of alcohol.

The phase 3/registration stability and commercial products differ in the deboss ("Depomed" vs "SLV") and coat color (white vs. beige) for 600 mg tablets and the deboss ("Depomed" vs "SLV") for 300 mg tablets.

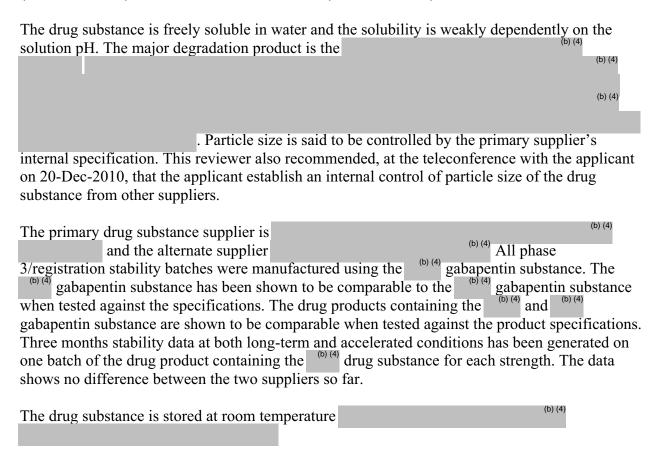
and there is no manufacturing process change from phase 3 to commercial manufacturing, the change in tablet dress is considered minor. The applicant provided long-term stability data for three registration batches of each strength in both bottle and blister packaging configurations. The registration batches were shown to be stable over 24 - 36 months at the long-term storage condition (25  $^{\circ}$ C / 60%RH). The applicant also provided the stability data for one batch of 600 mg tablets with the commercial dress (deboss and color). The stability of the commercial 600 mg





#### **Executive Summary Section**

tablets was comparable to the phase 3/registration batches over 3 months at long-term condition  $(25 \, ^{\circ}\text{C} / 60\%\text{RH})$  and the accelerated condition  $(40 \, ^{\circ}\text{C} / 75\%\text{RH})$ .



The applicant submitted a Comparability Protocol to support post-approval addition of an alternate drug product manufacturing site. The applicant has not specified what changes will be involved and therefore this protocol was insufficient. A bioequivalence study will be required if a level 3 site change will take place, as the IVIVC has not been accepted by the Biopharmaceutics team. The applicant should submit the drug product alternate manufacturing site post approval.

# B. Description of How the Drug Product is Intended to be Used

The drug product is packaged in bottles and blister packs for pharmacy (trade) and physician (samples) distribution. The bottle container-closure system consists of tablets to be packaged in white opaque high density polyethylene (HDPE) bottles. The bottle and cap are induction sealed and do not contain a filler. The blister pack container-closure system consists of different configurations to be used as starter kits, titration kits, and unit dose packages. The blister material is

(b) (4) and the backing material is aluminum foil with a heat-seal layer.

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#### **CHEMISTRY REVIEW**



## **Executive Summary Section**

The drug product will be taken orally once daily with food (evening meal). The maximum daily dose of gabapentin is 1800 mg.

The applicant proposed a expiration dating period for the drug product. However, after reviewing the stability data, this reviewer recommends a 24-month expiration dating period for the tablets of both strengths packaged in either the bottle or blister packaging configurations. The tablets are to be stored at 25°C (77°F); excursions permitted to 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature].

## C. Basis for Approvability or Not-Approval Recommendation

The applicant has satisfactorily provided the information requested based on the CMC Review #1. The applicant has revised the tablet dissolution acceptance criteria in the product specification as requested by the Biopharmaceutics team. The NDA has provided adequate scientific information to support the identity, purity, strength, and quality of the drug product.

The manufacturing facilities have been deemed acceptable by the Office of Compliance.

The following comment should be communicated to the applicant in the Action Letter.

O The comparability protocol to support an alternate drug product manufacturer is insufficient. Addition of a drug product manufacturing site may require a bioequivalence study. You may discuss with the Agency and submit the alternate drug product manufacturing site and supporting data post-approval.

#### III. Administrative

A. Reviewer's Signature

See DARRTS.

**B.** Endorsement Block

See DARRTS.

C. CC Block

See DARRTS.

Reference ID: 2891128

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# This is a representation of an electronic record that was signed electronically and this page is the manifestation of the electronic signature.

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/s/

\_\_\_\_\_

YONG HU 01/13/2011

The NDA can be approved from CMC perspective.

PRASAD PERI 01/13/2011 I concur

Reference ID: 2891128





# NDA 22-544

# **Gabapentin Extended-Release Tablet**

**Abbott Products, Inc** 

Yong Hu, Ph.D.

Office of New Drug Quality Assessment

For

**Division of Anesthesia and Analgesia Products** 





# **Table of Contents**

Ch	mistry Review Data Sheet	3
Th	Executive Summary	7
I. I	ecommendations	7
	Recommendation and Conclusion on Approvability	7
	Recommendation on Phase 4 (Post-Marketing) Commitments, Agreements, and/or Risk Management Steps, if Approvable	
II.	ummary of Chemistry Assessments	7
	Description of the Drug Product(s) and Drug Substance(s)	7
	. Description of How the Drug Product is Intended to be Used	9
	Basis for Approvability or Not-Approval Recommendation	9
III.	Administrative	10
	Reviewer's Signature	10
	Endorsement Block	10
	CC Block	10
Ch	mistry Assessment	11
I.	Leview Of Common Technical Document-Quality (Ctd-Q) Module 3.2: Body Of D	ata11
	DRUG SUBSTANCE [Gabapentin, (b) (4).	11
	DRUG SUBSTANCE [Gabapentin, (b) (4)].  DRUG SUBSTANCE [Gabapentin, (b) (4)]	16
	DRUG PRODUCT [Gabapentin, Extended-Release Tablet, 300 and 600 mg]	
	APPENDICES	75
	REGIONAL INFORMATION	76
II.	teview Of Common Technical Document-Quality (Ctd-Q) Module 1	76
	. Labeling & Package Insert	76
	Environmental Assessment Or Claim Of Categorical Exclusion	76
III.	List Of Comments/Information Request To Be Communicated	77
A ++	hmanta	70





Chemistry Review Data Sheet

# **Chemistry Review Data Sheet**

1. NDA: 22-544

2. REVIEW #: 1

3. REVIEW DATE: 03-Dec-2010

4. REVIEWER: Yong Hu, Ph.D.

5. PREVIOUS DOCUMENTS:

Previous Documents Document Date

N/A

Reference ID: 2872219

# 6. SUBMISSION(S) BEING REVIEWED:

Submission(s) Reviewed	<b>Document Date</b>
Original submission	30-Mar-2010
Amendment (Establishment information)	20-Apr-2010
Amendment (Response to 74-day letter)	06-Aug-2010
Amendment (Response to CMC IR)	19-Aug-2010
Amendment (Response to CMC IR)	23-Aug-2010
Amendment (Comparability protocol)	28-Oct-2010
Amendment (Response to CMC IR)	12-Nov-2010
Emailed Response to CMC IR	23-Nov-2010

#### 7. NAME & ADDRESS OF APPLICANT:

Name: Abbott Products, Inc

Address: 901 Sawyer Road, Marietta, GA 30062

Representative: Michael F. Hare, Asst. Dir

Telephone: 770-578-5620

#### 8. DRUG PRODUCT NAME/CODE/TYPE:

a) Proprietary Name: Gralise extended-release tablet

b) Non-Proprietary Name (USAN): Gabapentin extended-release tablet

c) Code Name/# (ONDC only): DM-1796

# C DES

# **CHEMISTRY REVIEW**



Chemistry Review Data Sheet

- d) Chem. Type/Submission Priority (ONDC only):
  - Chem. Type: 3
  - Submission Priority: S
- 9. LEGAL BASIS FOR SUBMISSION:

505 b(2); The RLD is the immediate-release product Neurontin (NDAs 20-129, 20-235, 20-882, 21-397, 21-423, and 21-424) from Pfizer.

10. PHARMACOL. CATEGORY and INDICATION:

Anticonvulsant/Analgesic; Treatment of postherpetic neuralgia (PHN).

11. DOSAGE FORM:

Extended-release tablet

12. STRENGTH/POTENCY:

300 and 600 mg

13. ROUTE OF ADMINISTRATION:

Oral

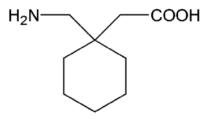
Reference ID: 2872219

- 14. Rx/OTC DISPENSED: <u>x</u> Rx OTC
- 15. SPOTS (SPECIAL PRODUCTS ON-LINE TRACKING SYSTEM):

\_\_\_\_SPOTS product Form Completed

\_\_\_x \_\_Not a SPOTS product

16. CHEMICAL NAME, STRUCTURAL FORMULA, MOLECULAR FORMULA, MOLECULAR WEIGHT:



Chemical name: 1-(Aminomethyl)cyclohexaneacetic acid

Molecular formula: C9H17NO2 Molecular Weight: 171.24





Chemistry Review Data Sheet

# 17. RELATED/SUPPORTING DOCUMENTS:

#### A. DMFs:

DMF #	ТҮРЕ	HOLDER	ITEM REFERENCED	CODE <sup>1</sup>	STATUS <sup>2</sup>	DATE REVIEW COMPLETED	COMMENTS
(b) (4)	II	(b) (4)	Gabapentin drug substance	3	Adequate	21-Jun-2010	
	II		Gabapentin drug substance	1	Adequate	22-Nov-2010	
	IV		Hypromellose (b) (4)	4	N/A		
	IV		Microcrystalline cellulose (b) (4)	4	N/A		
	IV		Polyethylene oxide (b) (4)	4	N/A		
	IV		Opadry II white and beige	4	N/A		
	III		(b)	4	N/A		
	III			4	N/A		
	III			4	N/A		
	III			4	N/A		
	IV			4	N/A		

<sup>&</sup>lt;sup>1</sup> Action codes for DMF Table:

1 – DMF Reviewed.

Other codes indicate why the DMF was not reviewed, as follows:

- 2 Type 1 DMF
- 3 Reviewed previously and no revision since last review
- 4 Sufficient information in application
- 5 Authority to reference not granted
- 6 DMF not available
- 7 Other (explain under "Comments")

Reference ID: 2872219 Page 5 of 82

<sup>&</sup>lt;sup>2</sup> Adequate, Inadequate, or N/A (There is enough data in the application, therefore the DMF did not need to be reviewed)





# Chemistry Review Data Sheet

# **B.** Other Documents:

DOCUMENT	APPLICATION NUMBER	DESCRIPTION
IND	71,439	Gabapentin extended-release
		tablet sponsored by the applicant.

# 18. STATUS:

CONSULTS/ CMC RELATED REVIEWS	RECOMMENDATION	DATE	REVIEWER
Biometrics	Not requested.		
EES	Acceptable.	26-May-2010	A. Inyard
Pharm/Tox	(b) (4) (b) (4)	30-Nov-2010	Armaghan Emami
	in the drug product is acceptable,	(wrap-up meeting)	
	based on the specification of		
	Neurontin, the RLD.		
Biopharm	Tablet dissolution specification and	30-Nov-2010	Sandra Suarez
	IVIVC model are not acceptable.  (b) (4)	(Wrap-up meeting)	
	The drug product	Biopharm review	
	should not be classified as an	(dated 22-Nov-	
	extended-release product taking	2010; signed off on	
	into account the higher plasma	03-Dec-2010)	
	concentration fluctuation index		
	compared to Neurontin IR. The		
	comparability protocol for the		
	addition of a drug product		
	manufacturing site post approval is		
	pending.		
LNC	N/A		
Methods Validation	Not requested for the conventional		
	methods.		
OPDRA	N/A		
EA	Categorical exclusion granted.	03-Dec-2010	Yong Hu
Microbiology	N/A. Oral tablet.		



**Executive Summary Section** 

# The Chemistry Review for NDA 22-544

# The Executive Summary

## I. Recommendations

## A. Recommendation and Conclusion on Approvability

The NDA is approvable from CMC perspective. The manufacturing facilities have been deemed acceptable by the Office of Compliance.

The final "Approval" recommendation is pending until

- 1. The applicant revises the drug product dissolution specification as requested by the Biopharm team.
- 2. The applicant provides an adequate response to the requested information described at the end of this review;
  - B. Recommendation on Phase 4 (Post-Marketing) Commitments, Agreements, and/or Risk Management Steps, if Approvable

None at this time.

Reference ID: 2872219

# II. Summary of Chemistry Assessments

# A. Description of the Drug Product(s) and Drug Substance(s)

The product is an extended-release tablet, 300 mg and 600 mg, referred to by the applicant as G-ER (Note: the Biopharm team recommend that the product should not be classified as an extended-release product based on the plasma concentration fluctuation index; see the Biopharm review dated 22-Nov-2010 and signed off on 03-Dec-2010). The tablets are intended for oral administration in the treatment of postherpetic neuralgia in adults at a dose of up to 1800 mg once-daily. The tablets are targeted to deliver approximately 90% of the total daily dose of gabapentin over approximately a 10 hour period to the upper gastrointestinal (GI) tract, where the drug is claimed to be most efficiently absorbed. Gastric retention of the tablets is critical to delivering the drug to the upper GI tract over an extended period. When administered with a meal, the tablet is said to swell to the size which promotes gastric retention. The extended drug release is claimed to be achieved by the diffusional control of the drug in the matrix of the (b) (4). The same polymers also control the swelling of polymers the tablets. The tablet swelling is indicated by the significant weight gain in mSGF from an invitro study, however, no data has been provided regarding the swelled tablet size. The tablet is said to exit the stomach during Phase III of the migrating motor complex (housekeeper wave) in the fasting state and to transit through the GI tract and dissolve away. The applicant states that the same formulation technology has also been used in the approved NDA 21-744 (Proquin XR ciprofloxacin HCl) and NDA 21-748 (Glumetza ER Metformin HCl).



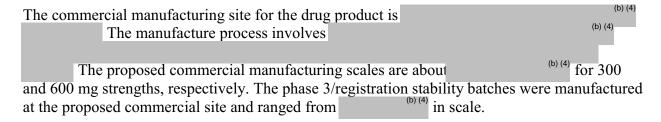


#### **Executive Summary Section**

The 300 mg tablets are white to off-white, film-coated, 0.3937" X 0.6299" modified oval shaped tablets that are 714 mg in weight, and debossed with "SLV" on one side and with "300" on the other side.

The 600 mg tablets are beige, film-coated, 0.4330" x 0.7450" modified oval shaped tablets that are 1020 mg in weight, and debossed with "SLV" on one side and with "600" on the other side.

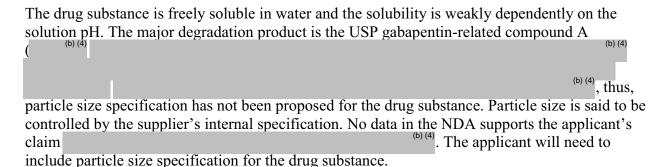
The excipients for the 300 and 600 mg tablets are polyethylene oxide, hypromellose, copovidone, magnesium stearate microcrystalline cellulose (300 mg), Opadry® II white (300 mg) and beige (600 mg).



The Biopharm review determined that the tablet dissolution acceptance criteria and the IVIVC model are not acceptable. An in-vitro study showed that the drug release is decreased with increasing concentration of alcohol in the dissolution medium, suggesting a low risk of dose dumping in the presence of alcohol.

The phase 3/registration stability and commercial products differ in the deboss ("Depomed" vs "SLV") and coat color (white vs. beige) for 600 mg tablets and the deboss ("Depomed" vs "SLV") for 300 mg tablets.

and there is no manufacturing process change from phase 3 to commercial manufacturing, the change in tablet dress is considered minor. The applicant provided long-term stability data for three registration batches of each strength in both bottle and blister packaging configurations. The registration batches were shown to be stable over 24 - 36 months at the long-term storage condition (25 °C / 60%RH). The applicant also provided the stability data for one batch of 600 mg tablets with the commercial dress (deboss and color). The stability of the commercial 600 mg tablets was comparable to the phase 3/registration batches over 3 months at long-term condition (25 °C / 60%RH) and the accelerated condition (40 °C / 75%RH).



Reference ID: 2872219 Page 8 of 82





#### **Executive Summary Section**

and the alternate supplier  3/registration stability batches were manufactured using the  (b) (4)  gabapentin substance. The
3/registration stability batches were manufactured using the gabapentin substance. The
gabapentin substance has been shown to be comparable to the gabapentin substance
when tested against the specifications, however, the applicant has not provided a comparison of
the particle size distribution for the drug substances from both suppliers. This information will be
requested to assess the risk of bioequivalence of the alternate source drug substance. In addition,
as mentioned above, the applicant will need to include particles size specification for the drug
substance. The drug products containing the (b) (4) and gabapentin substance are shown to
be comparable when tested against the product specifications. Three months stability data at both
long-term and accelerated conditions has been generated on one batch of the drug product
containing the drug substance for each strength. The data shows no difference between the
two suppliers so far.

The drug substance is stored at room temperature (b) (4)

The applicant submitted a Comparability Protocol to support post-approval addition of an alternate drug product manufacturing site. The protocol will be evaluated in the next review. Biopharm input will also be necessary to determine the adequacy of the protocol.

## B. Description of How the Drug Product is Intended to be Used

The drug product is packaged in bottles and blister packs for pharmacy (trade) and physician (samples) distribution. The bottle container-closure system consists of tablets to be packaged in white opaque high density polyethylene (HDPE) bottles. The bottle and cap are induction sealed and do not contain a filler. The blister pack container-closure system consists of different configurations to be used as starter kits, titration kits, and unit dose packages. The blister material is

(b) (4) and the backing material is aluminum foil with a heat-seal layer.

The drug product will be taken orally once daily with food (evening meal). The maximum daily dose of gabapentin is 1800 mg.

A 24-month expiration dating period is recommended for the tablets of both strengths packaged in either the bottle or blister packaging configurations. The tablets are to be stored at 25°C (77°F); excursions permitted to 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature].

#### C. Basis for Approvability or Not-Approval Recommendation

The Biopharmaceutics review has determined that the drug product dissolution acceptance criterion is not acceptable. The applicant will need to revise the acceptance criteria for dissolution as requested by the Biopharm team.

Reference ID: 2872219 Page 9 of 82

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## **CHEMISTRY REVIEW**



## **Executive Summary Section**

The acceptance criterion for the total impurities in the drug product should be tightened to reflect the batch stability data and also to be in line with the USP specification for gabapentin tablets.

The applicant has not provided adequate data to justify the omission of particle size specification for the drug substance. Particle size control should be implemented to mitigate the risk of bioequivalence for drug substance from different suppliers.

The applicant has not provided an adequate post-approval stability protocol.

See the details of the comments/information request at the end of the review. The applicant should be able to address the comments during the review cycle.

The alternate supplier for the drug substance will not be approved until the applicant shows comparable particles size data of the alternate source drug substance with that of the primary source drug substance or otherwise justified with data.

The Comparability Protocol for the post-approval addition of an alternate drug product manufacturer is being reviewed. However, the decision on the protocol will not affect the approvability of the NDA.

#### III. Administrative

A. Reviewer's Signature

See DARRTS.

**B.** Endorsement Block

See DARRTS.

C. CC Block

See DARRTS.

The NDA is approvable. The CMC comments/information request should be sent to the applicant.

PRASAD PERI 12/03/2010

12/03/2010

I concur

Reference ID: 2872219