

# HPLC and Spectrophotometric Analysis of Injectables Advertised as GC376 or GS-441524 Found to Contain EIDD-2801 as the Main Active Ingredient







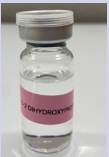
Presented by the FIP Warriors<sup>®</sup> Research Team



# The Following is a Summary of the Data Collected During an Investigation by FIP Warriors® between February -July 2023

The summary includes:

- UV and pH measurements performed by the FIP Warriors® research team
- HPLC and UV measurements performed by Expert Synthesis Solutions
- GC-MS performed by Toxicology Associates for FIP Warriors® and FIP Global CATS  
with disclaimer of improper testing
- Brief reports of incidents associated with the use of 2 of the tested brands
- Resources and contacts

NAME/DESCRIPTION	IMAGE	ADVERTISED DRUG AND CONCENTRATION	ACTUAL DRUG FOUND AND CONCENTRATION*	MEASURED PH
<b>GC376</b> 2ml vial clear cap (sent by Nicole Jacque)		GC376 53mg/ml	EIDD-2801 50mg/ml (HPLC and UV)	6.53-7.08 (multiple vials tested)
<b>SUYI BIO</b> (same as Hebei Ruiyao Biotech)		GS-441524 20mg/ml	EIDD-2801 40mg/ml (HPLC and UV)	5.19
<b>PethealthFIP</b> Gold and pink cap (pethealthfip.com)		GS-441524 20mg/ml (pink) and 30mg/ml (gold)	EIDD-2801 70mg/ml (pink) and 60mg/ml (gold) (UV)	5.70 (pink ) 5.89 (gold)
<b>Cat rehabilitation nutrition supplement-appetizer</b> (sold with syringe)		GS-441524 20mg/ml	EIDD-2801 70mg/ml (UV)	6.87
<b>Chariot</b> (distributed from North Carolina)		GS-441524 20mg/ml	EIDD-2801 35mg/ml (UV)	6.34
5 and 10ml purple cap vials sold by “Susan” (XUN HE- connected to Ruiyao Biotech)	  Susan +86 199481	GS-441524 20mg/ml (later seller declared to use “anti-freeze” which led to the death of 2 cats due to kidney failure)	EIDD-2801 65-70mg/ml (UV)	5.51 (5ml) 5.59 (10ml)
Labeled 1,2-dihydroxypropane 10ml vial		GS-441524 20mg/ml	EIDD-2801 70mg/ml (UV)	4.80

\*concentration is estimated from the UV spectra

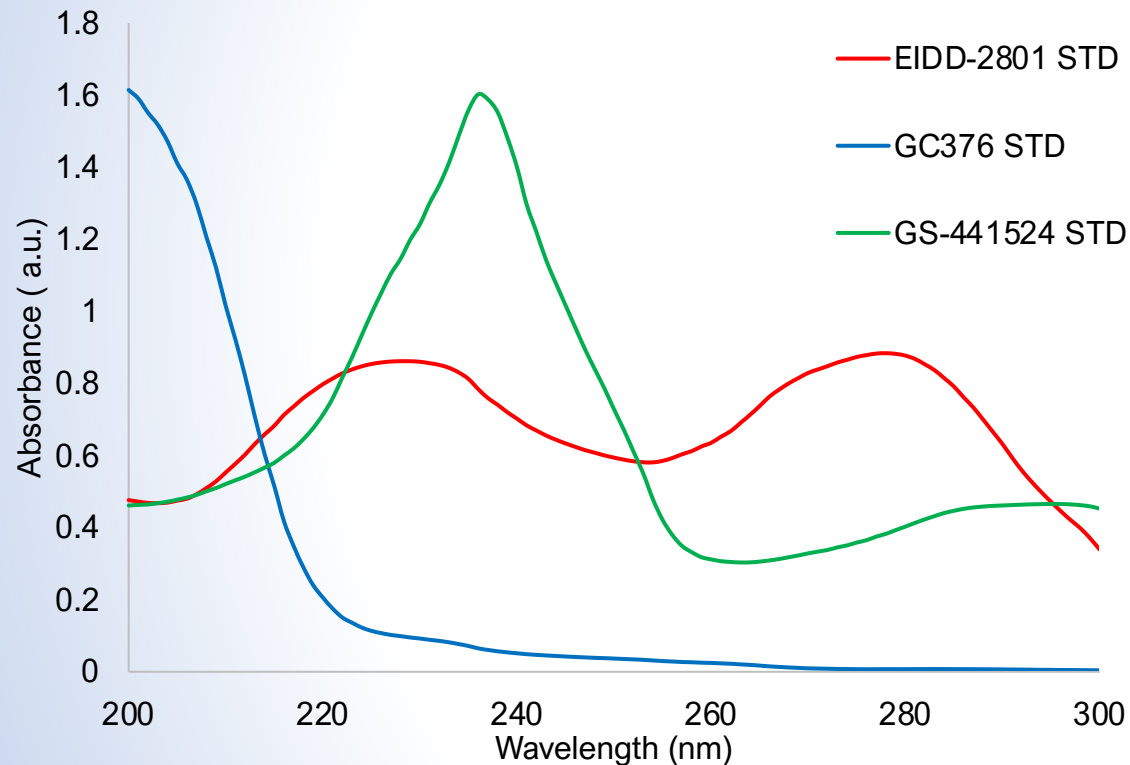
# NOTES

- The tested brands of GS-441524 were advertised as “painless”, “water-based” GS-441524 at pH 6-7
- In China, the current cost of GC376 API is **5-10x the cost** of GS-441524 and about **100x the cost** of EIDD-2801. **Therefore, it is not possible to purchase vials of GC376 at a cost comparable to or lower than GS-441524.**
- The pH was measured with a Thermo Scientific Orion Star A111 pH meter, calibrated with 3 buffers. The correct measurement of the pH was further verified using a control buffer at pH 1.68 purchased from Fisher Scientific.
- The UV spectra were recorded with a spectrophotometer Spectramax M5 and compared to a standard reference purchased from Medkoo Biosciences.
- Expert Synthesis Solution (ESS) performed the HPLC analysis and replicated the UV spectrophotometric analysis confirming the results.

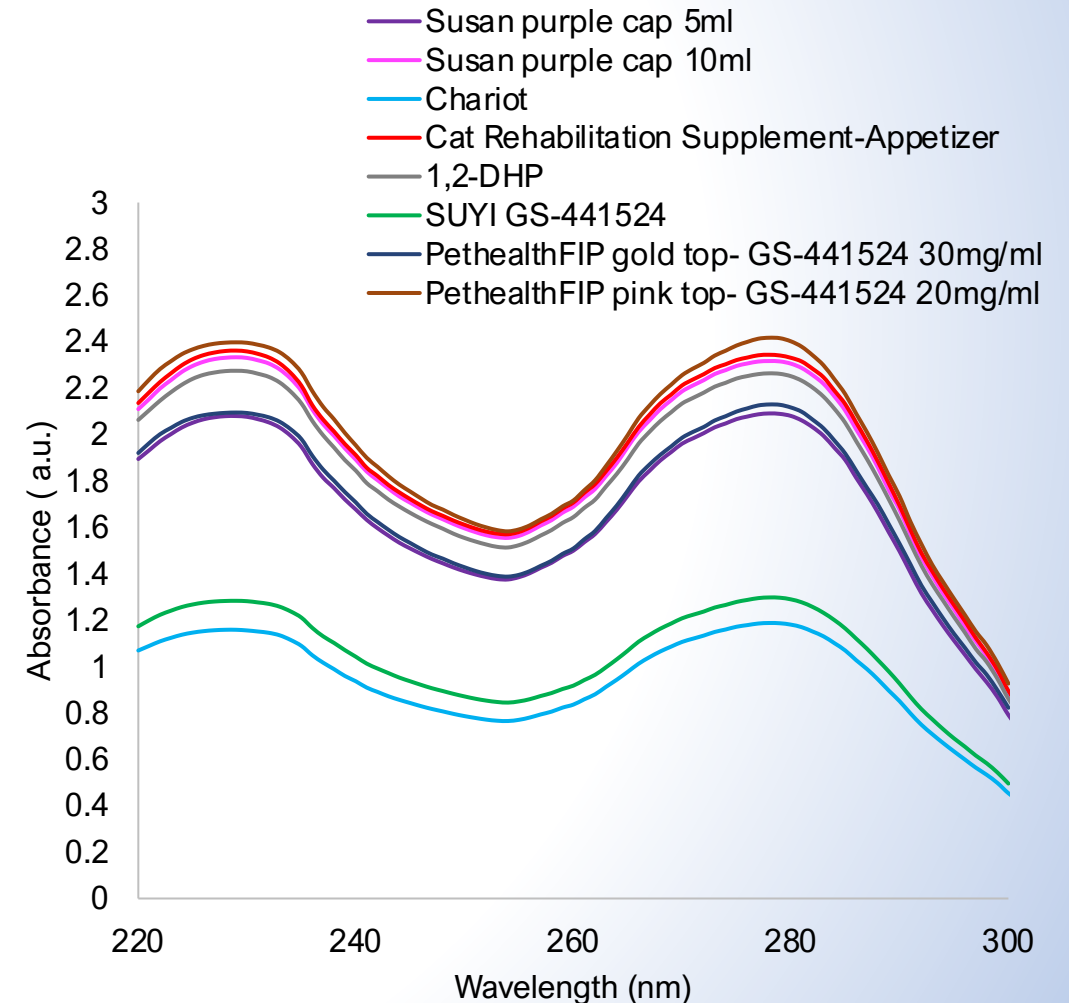


# UV and pH Measurements Performed by the FIP Warriors<sup>®</sup> Research Team

## UV spectra of the standards



## UV spectra of the samples

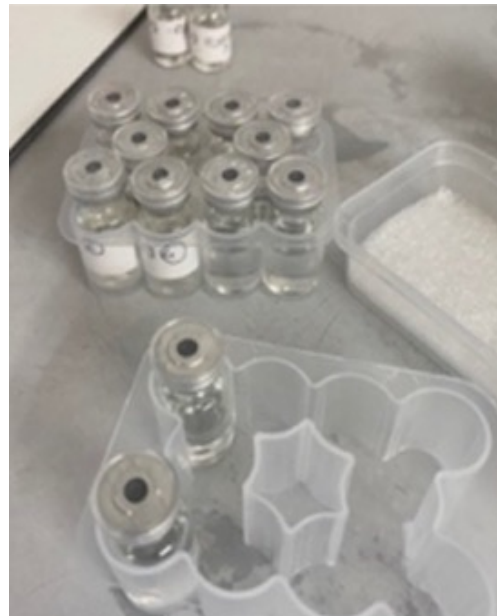


**CONCLUSION:** The spectra of the samples match the one of EIDD-2801 standard reference. HPLC is needed to confirm if the samples contain EIDD-2801 or EIDD-1931.

# UV and pH Measurements Performed by the FIP Warriors<sup>®</sup> Research Team

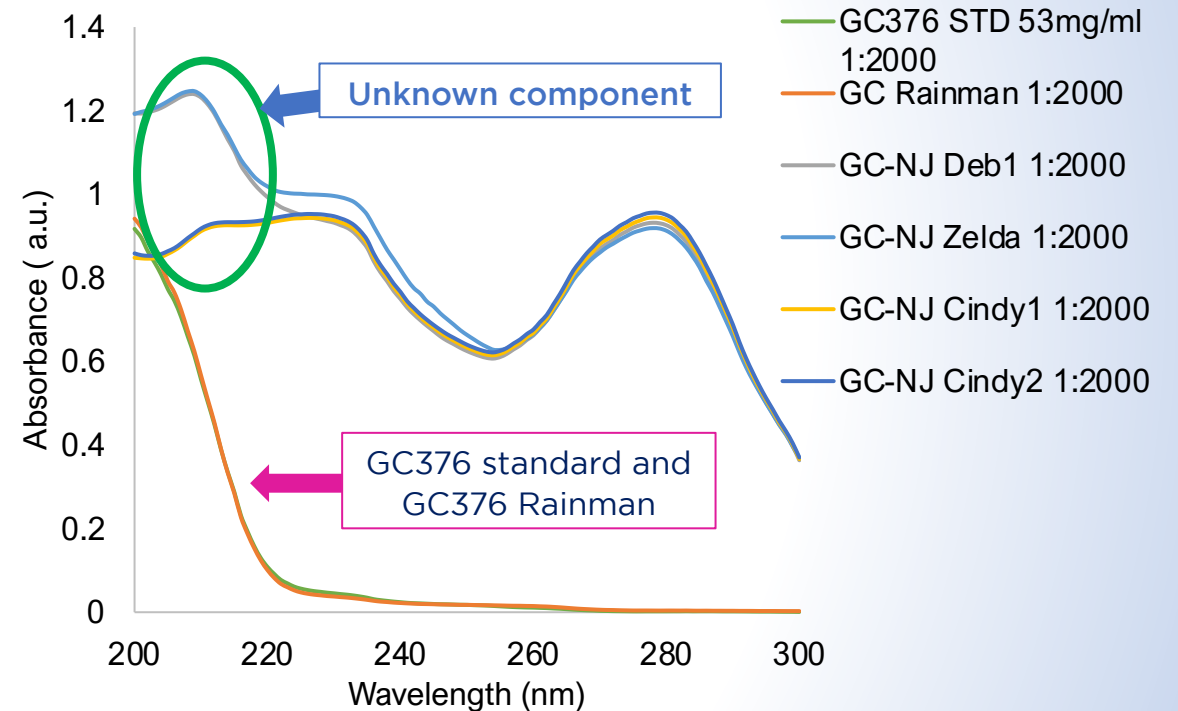


Rainman GC376



New "GC376"

UV spectra of a standard of GC376 compared to Rainman GC and the new vials advertised as GC376

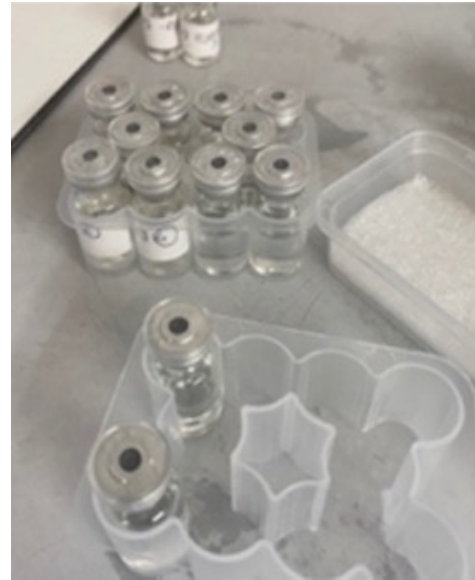


Earlier this year, it was noted that the GC376 vials distributed had changed without any notice. Therefore, multiple samples from different parents have been collected and tested. All the samples tested showed the presence of EIDD and possibly other components at the UV.

# UV and pH Measurements Performed by the FIP Warriors<sup>®</sup> Research Team

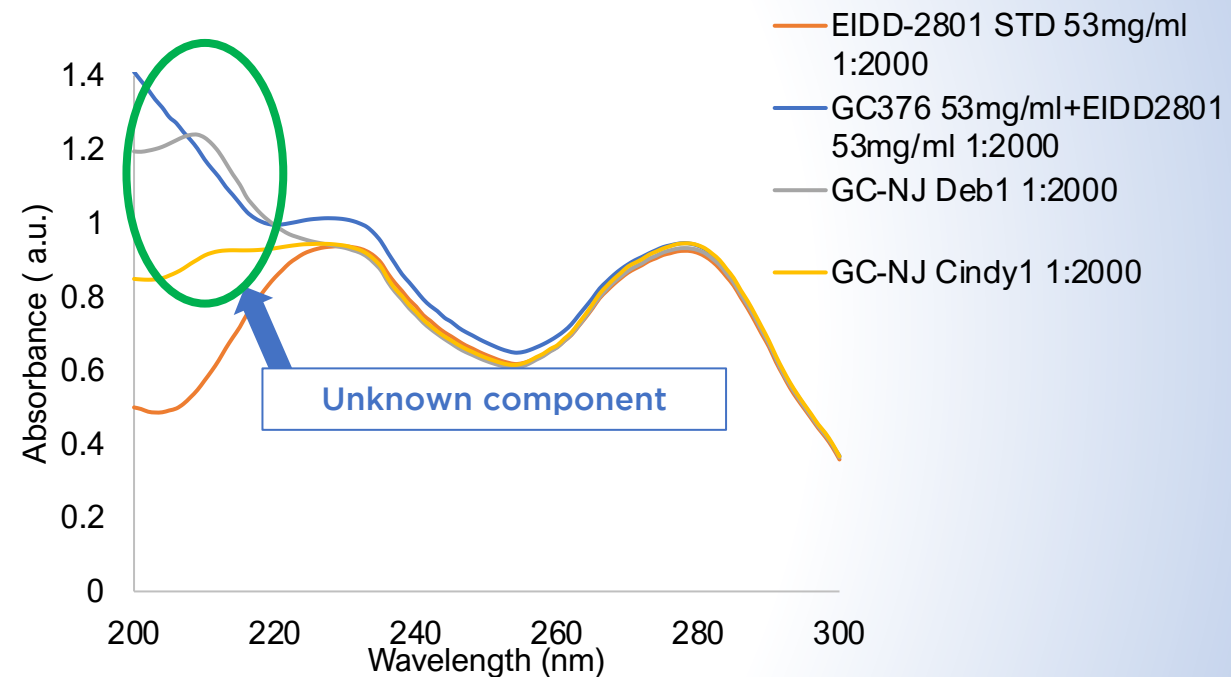


Rainman GC376



New "GC376"

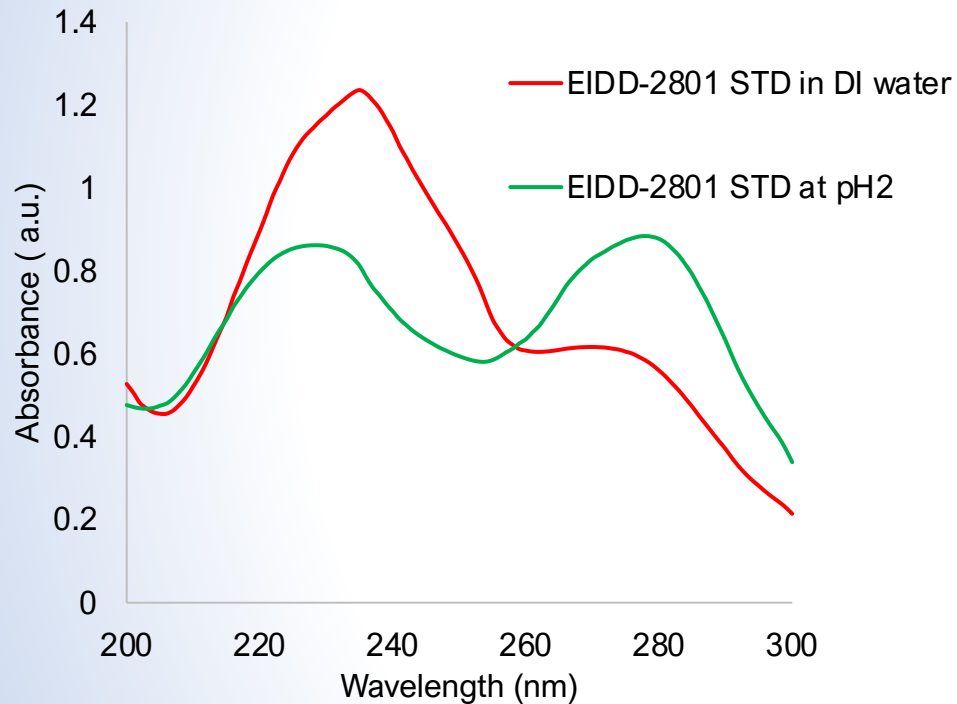
UV spectra of a standard of EIDD-2801 compared to the new vials advertised as GC376



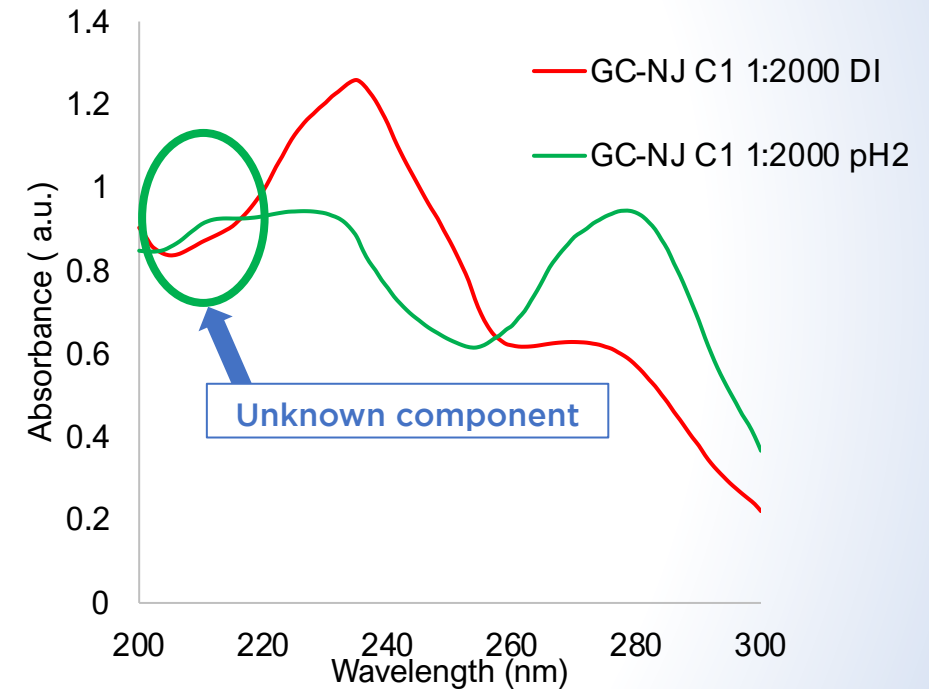
- The "new GC" in clear cap vials was compared to a standard of EIDD-2801 at 53mg/ml showing a perfect overlap of the region between 230nm and 300nm. That indicates the possible presence of EIDD-2801 at similar concentration
- We compared the spectra to a solution combining GC376 and EIDD-2801 but there is no overlap in the lower region
- The samples were sent to ESS for HPLC analysis, confirming the presence of EIDD-2801. GC376 was not detected

# UV and pH Measurements Performed by the FIP Warriors<sup>®</sup> Research Team

UV spectra of the GC376 standard at different pH




UV spectra of the new "GC376" at different pH



The spectrum of EIDD-2801 is well documented in literature\* and shows a different profile depending on the pH. The new vials distributed as substitution to GC376 from Rainman showed a UV spectrum similar to EIDD-2801 at both the tested pH. A third peak below 220nm appears at pH 2 which may be due to an excipient or another drug.



# HPLC and UV Measurements Performed by Expert Synthesis Solutions

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FINAL REPORT  
Document#: FR-ESS070823  
Revision: 1  
Date: 07/08/23

REPORT FOR HPLC METHOD DEVELOPMENT FOR THE  
IDENTIFICATION OF EIDD-2801, EIDD-1931, GC376, AND GS-441524 IN  
CAPSULES AND INJECTABLE FINISHED PRODUCTS

Revision history: R01. 07/08/23 - The document was generated

Prepared by:



Viorica Rusu, QA/QC Manager

Table 1. List of Raw Materials and Finished Products

Raw Material (Standard) Name	Lot#	Manufacturer	Quantity	Date received
EIDD-1931 (99%)	T20D09P22	MedKoo Biosciences	100 mg	standards
EIDD-2801 (99%)	C22R02B02	MedKoo Biosciences	100 mg	
GC376 Sodium	C9R03B20	MedKoo Biosciences	100 mg	
GS-441524	C21R07B12	MedKoo Bioscience	135 mg	
Finished Product	Composition			
EIDD-2801 capsules	50mg EIDD-2801	Not available		
EIDD-1931 capsules	50mg EIDD-1831	Not available		
GS-441524 capsules	20mg GS-441524	Not available		
GC-NJ	GC-376/EIDD-2801/EIDD-1931, 53 mg/mL	Not available	5 vials x 2mL	06/29/2023
GS-SUYI	GS-441524/EIDD-2801/EIDD-1931, 20-40mg/mL	Not available	1 vial x 5mL	
GC-RAINMAN	GC376 (PEG400 Ethanol Water ) 53mg/mL	Not available	1 vial x 4mL	
GS-441524 Injectable (batch 4-12-23)	GS-441524 (PEG400, prop gly, water, ethanol) 20mg/mL	Not available	1 vial x10mL	
Placebo (to GS-441524 Injectable)	(PEG400, prop gly, water, ethanol)	Not available	1 vial x10mL	
GC-TC *	Not Available	Not available	1 vial x2mL	07/06/23

\*GC-TC was shipped directly from Canada to ESS for testing  
The vial was donated by an owner whose cat had passed while utilizing the 2ml vials of “GC376”  
The cat exhibited low WBC (more details will be discussed later)

# HPLC and UV Measurements Performed by Expert Synthesis Solutions



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FINAL REPORT  
Document#: FR-ESS070823  
Revision: 1  
Date: 07/08/23

High-performance liquid chromatography (HPLC) methods were developed to identify the active ingredients in finished products listed in **Section 2**. The HPLC (equipped with DAD) technique involved the separation (elution at different retention times) of EIDD-2801, EIDD-1931, GC376, and GS-441524 in Raw Material (RM) solutions, monitoring the UV spectra as additional means of identification of these compounds, and compare them with main active ingredient in the samples prepared from injectable and capsule finished product listed in **Section 2**. The chromatographic analysis was performed using Zorbax SB-C18 4.6x250mm 5µm column, UV detection at 220nm with full UV spectrum acquisition. The mobile phase A was 100% 20mM KH<sub>2</sub>PO<sub>4</sub> buffer with pH7.5, and Mobile phase B was 100% Acetonitrile with a flow rate 1.0ml/min and the gradient ratios as per chromatographic conditions in **Section 4**. The individual Raw Materials were analyzed to identify their unique retention times (RT) and UV spectra. Finished Product sample solutions were analyzed and the RT and UV spectra of main peaks were compared to those of individual Raw Materials. The summary of the identification is presented in **Table 2**. Additionally, spiked with EIDD-2801 samples were prepared for GC-NJ, GS-SUYI and GC-TC injectable Finished Product and analyzed to confirm the presence of EIDD-2801 as main active ingredient in the unspiked samples.

Table 2. Summary of API identification in Finished Product

Finished Product	API			
	EIDD-1931	EIDD-2801	GC376 Sodium	GS-441524
EIDD-2801 capsules		V		
EIDD-1931 capsules	V			
GS-441524 capsules				V
GC-NJ		V		
GS-SUYI		V		
GC-RAINMAN			V*	
GS-441524 Injectable (batch 4-12-23)				V
Placebo (to GS-441524 Injectable)				ND
GC-TC		V		

\*NOTE 2: Some stability issues of GC376 in solution was observed (Lab Book (LB) reference: VR-4, p.140, 148, 150, 151)

## 5.3 ACTIVE INGREDIENT EIDD-2801



In the RM solution a major peak eluting at RT 9.682 min was observed (INJ ID: SIG11418). Similar major peak with matching RTs and same UV spectrum profile were observed in the following Finished Products:

- GC-NJ (INJ ID: SIG11420), confirmed by spiked sample (INJ ID: SIG11444);
- GS-SUYI (INJ ID: SIG11422), confirmed by spiked sample (INJ ID: SIG11446, SIG11448);
- GC-TC (INJ ID: SIG11457, SIG11460), confirmed by spiked sample (INJ ID: SIG11458, SIG11459);
- EIDD-2801 white capsules (INJ ID: SIG11427) (no need for spiked sample preparation as this product doesn't contradict with the active ingredient identification claim).

It is concluded that these Finished Products contain EIDD-2801 as active ingredient.

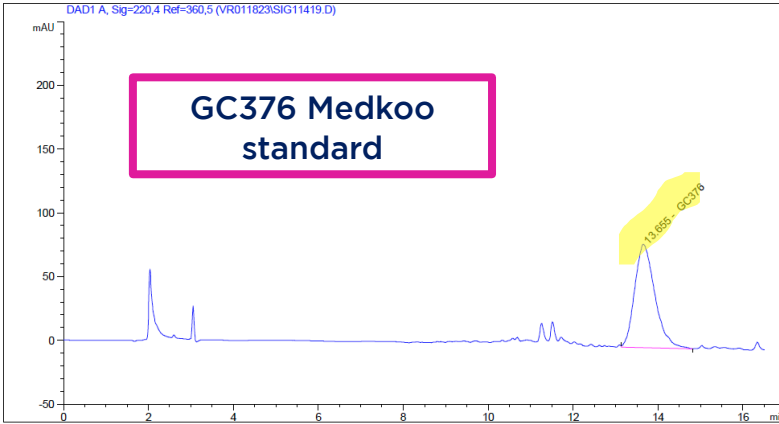
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Sample Name: GC376 dil with Buf, 90:10, 35C, 10µL

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Injection Date : 7/3/2023 1:39:20 PM Inj Volume : 10.0 µL

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Analysis Method : C:\CHEM32\1\METHODS\VR070323PM.M  
Last changed : 7/7/2023 2:06:39 PM by vrusu



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Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

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1	2.897		0.0000	0.00000	0.0000	EIDD-1931
2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.724		0.0000	0.00000	0.0000	EIDD-2801
5	13.655	VB	0.5095	2671.63672	100.0000	GC376

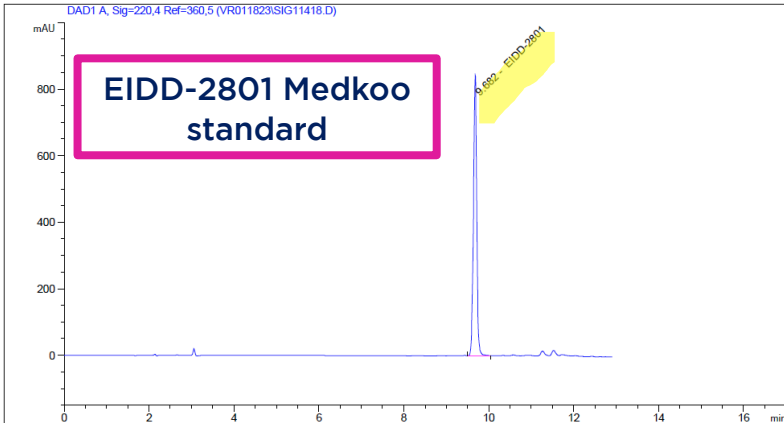
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Area Percent Report

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Dilution: : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	2.897		0.0000	0.00000	0.0000	EIDD-1931
2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.682	VB	0.0804	4522.33789	100.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376

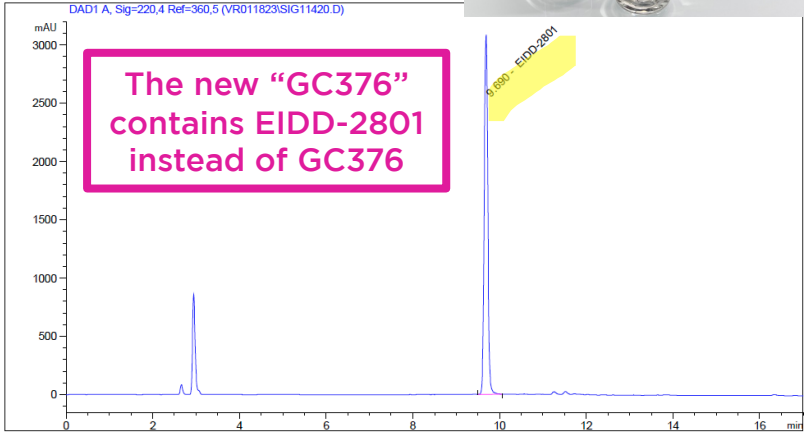
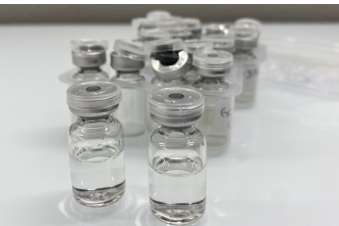
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Sample Name: GC-NJ, 1.3 mg/mL

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Analysis Method : C:\CHEM32\1\METHODS\VR070323PM.M  
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The new "GC376" contains EIDD-2801 instead of GC376

Area Percent Report

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Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	2.897		0.0000	0.00000	0.0000	EIDD-1931
2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.682	VB	0.0938	1.79519e4	100.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376

Totals : 1.79519e4



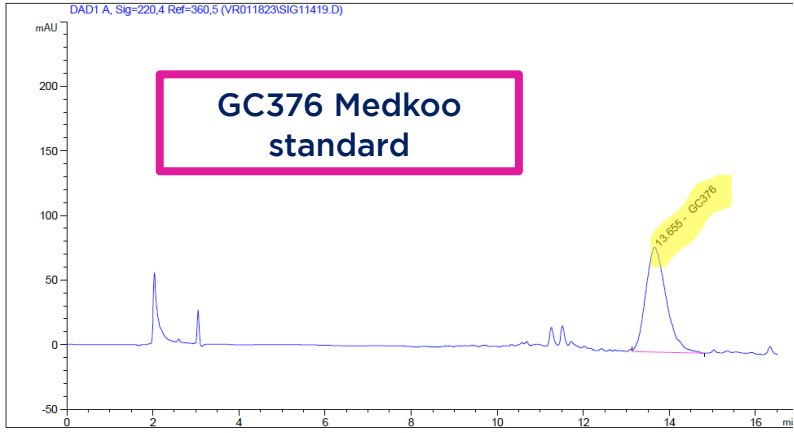
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Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

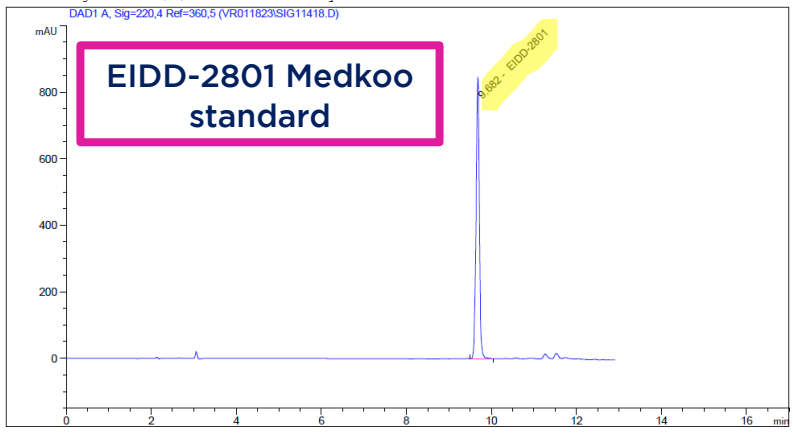
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2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.724		0.0000	0.00000	0.0000	EIDD-2801
5	13.655 VB		0.5095	2671.63672	100.0000	GC376
Totals :				2671.63672		

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Sample Name: EIDD2801 dil with Buf, 90:10, 35C, 10µL

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Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

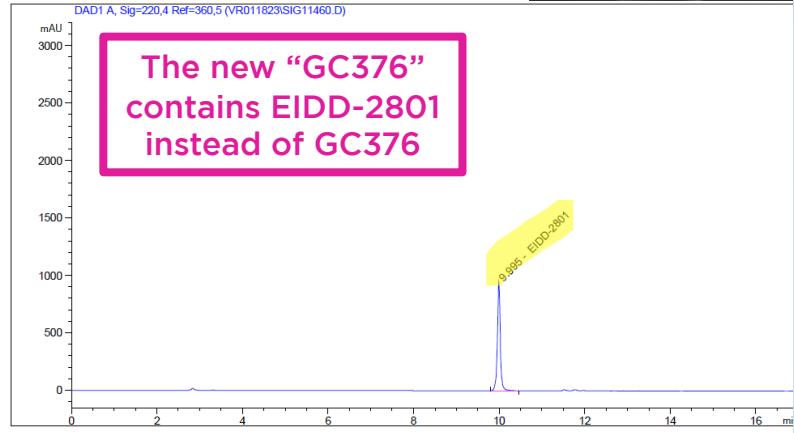
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
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2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.682 VB		0.0804	4522.33789	100.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376
Totals :				4522.33789		

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Sample Name: GC-TC, 2µL

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Area Percent Report  
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Sorted By : Signal  
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Dilution: : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	2.897		0.0000	0.00000	0.0000	EIDD-1931
2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.995 BB		0.0697	4549.85352	100.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376
Totals :				4549.85352		

# HPLC Measurements Performed by Expert Synthesis Solutions

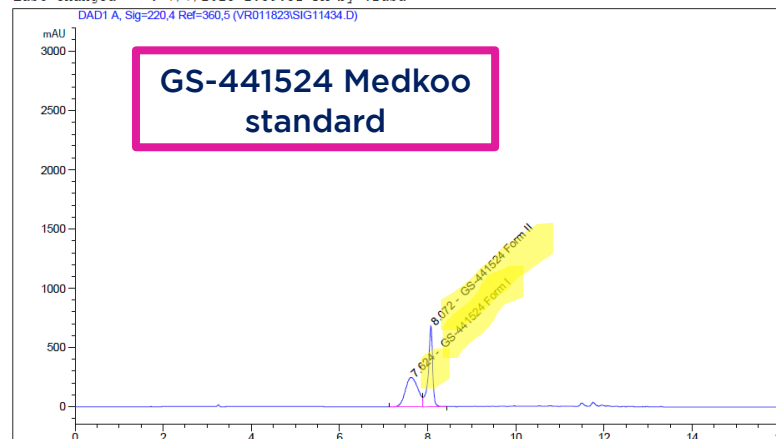
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## Area Percent Report

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Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
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2	7.624	BV	0.3176	4912.57422	50.9924	GS-441524 Form I
3	8.072	VB	0.1006	4721.36377	49.0076	GS-441524 Form II
4	9.724		0.0000	0.00000	0.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376

Totals : 9633.93799

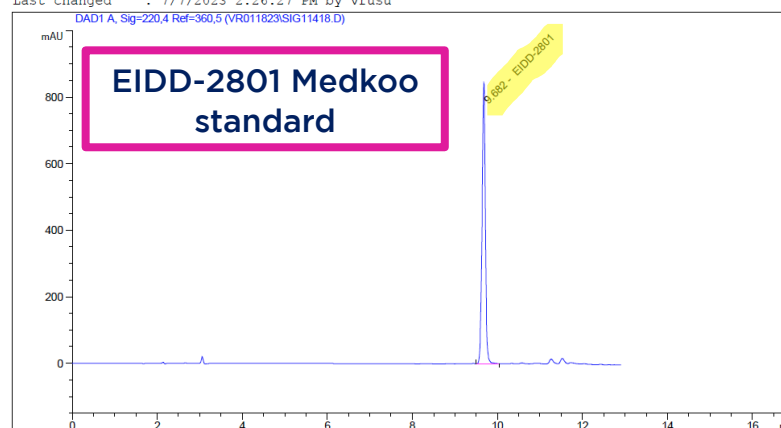
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Inj Volume : 10.0 µl

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Analysis Method : C:\CHEM32\1\METHODS\VR070323PM.M  
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## Area Percent Report

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Multiplier: : 1.0000  
Dilution: : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	2.897		0.0000	0.00000	0.0000	EIDD-1931
2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.682	VB	0.0804	4522.33789	100.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376

Totals : 4522.33789

Instrument 1 7/7/2023 2:26:28 PM vrusu

Page 1 of 2

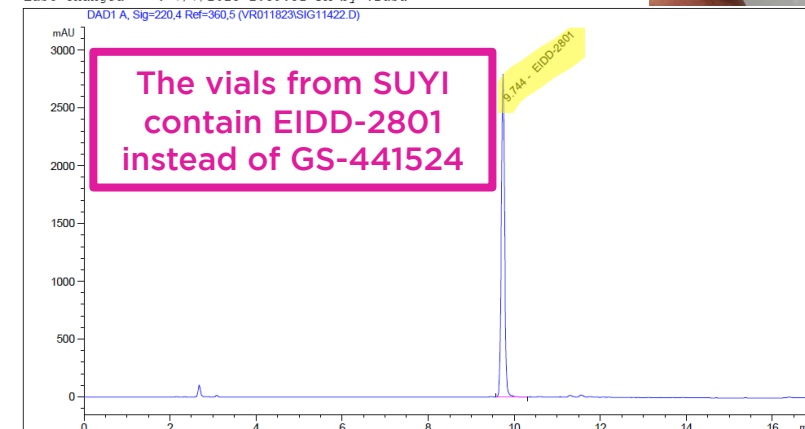
Data File C:\CHEM32\1\DATA\VR011823\SIG11422.D  
Sample Name: GS-SUYI, clear cap

=====

Acq. Operator : vrusu  
Acq. Instrument : Instrument 1 Location : Vial 14  
Injection Date : 7/3/2023 3:02:02 PM  
Inj Volume : 10.0 µl

Acq. Method : C:\CHEM32\1\METHODS\VR070323.M  
Last changed : 7/3/2023 2:55:23 PM by vrusu

Analysis Method : C:\CHEM32\1\METHODS\VR070323PM.M  
Last changed : 7/7/2023 2:39:31 PM by vrusu



The vials from SUYI  
contain EIDD-2801  
instead of GS-441524

## Area Percent Report

Sorted By : Signal  
Calib. Data Modified : 7/7/2023 1:44:41 PM  
Multiplier: : 1.0000  
Dilution: : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	2.897		0.0000	0.00000	0.0000	EIDD-1931
2	7.624		0.0000	0.00000	0.0000	GS-441524 Form I
3	8.072		0.0000	0.00000	0.0000	GS-441524 Form II
4	9.744	VV	0.0844	1.49504e4	100.0000	EIDD-2801
5	13.655		0.0000	0.00000	0.0000	GC376

Totals : 1.49504e4

Instrument 1 7/7/2023 2:41:50 PM vrusu

Page 1 of 2

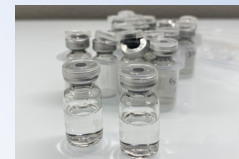


# UV measurements performed by Expert Synthesis Solutions

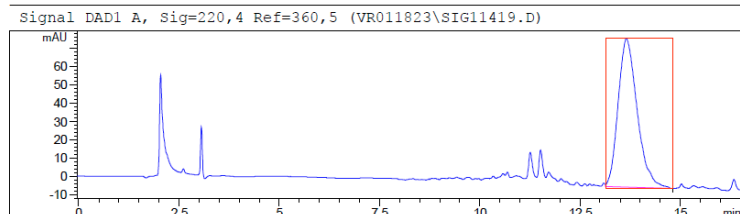
**GC376 Medkoo  
standard**

**EIDD-2801  
Medkoo  
standard**

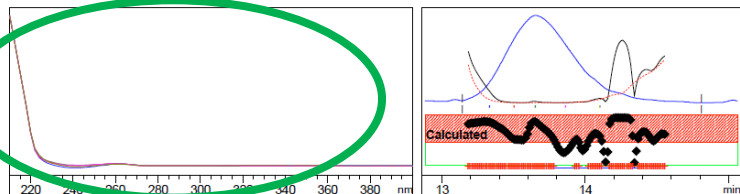
**The new “GC376”  
contains EIDD-2801  
instead of GC376**



Data File C:\CHEM32\1\DATA\VR011823\SIG11419.D  
Sample Name: GC376 dil with Buf, 90:10, 35C, 10µL



Peak :1 at 13.655 min. Name :

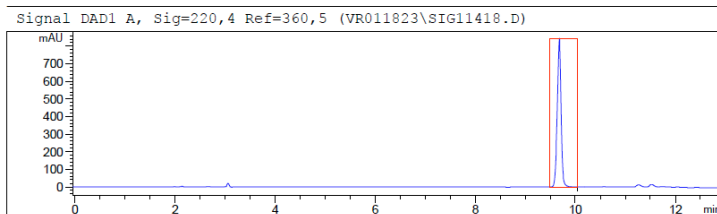


-> The purity factor exceeds the calculated threshold limit. <-

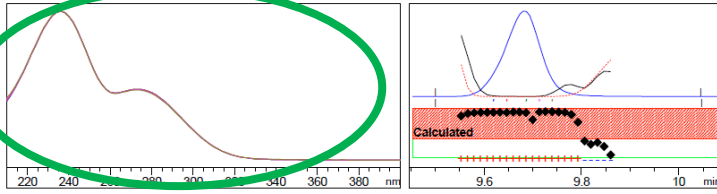
Purity factor : 979.851 (85 of 104 spectra exceed the calculated threshold limit.)  
Threshold : 996.886 (Calculated with 85 of 104 spectra)  
Reference : Peak start and end spectra (integrated) (13.143 / 14.809)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.147 (12 spectra, St.Dev 0.0529 + 3 \* 0.0313)

\*\*\* End of Report \*\*\*

Data File C:\CHEM32\1\DATA\VR011823\SIG11418.D  
Sample Name: EIDD2801 dil with Buf, 90:10, 35C, 10µL



Peak :1 at 9.600 min. Name :

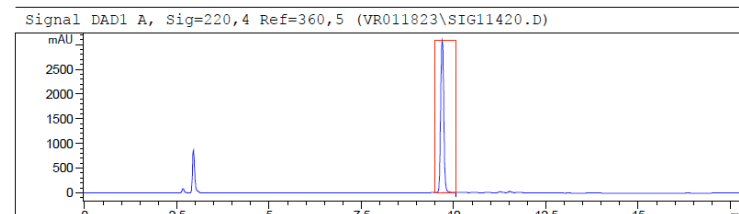


-> The purity factor exceeds the calculated threshold limit. <-

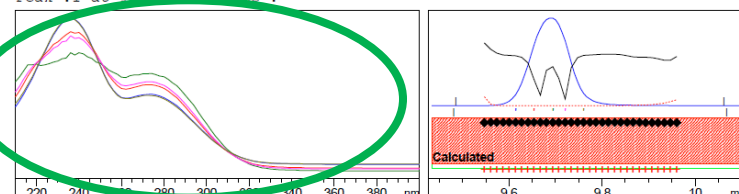
Purity factor : 998.840 (19 of 24 spectra exceed the calculated threshold limit.)  
Threshold : 999.835 (Calculated with 19 of 24 spectra)  
Reference : Peak start and end spectra (integrated) (9.500 / 10.046)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.110 (12 spectra, St.Dev 0.0541 + 3 \* 0.0186)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

\*\*\* End of Report \*\*\*

Data File C:\CHEM32\1\DATA\VR011823\SIG11420.D  
Sample Name: GC-NJ, 1.3 mg/mL



Peak :1 at 9.600 min. Name :



-> The purity factor exceeds the calculated threshold limit. <-

Purity factor : 964.163 (32 of 32 spectra exceed the calculated threshold limit.)  
Threshold : 999.949 (Calculated with 32 of 32 spectra)  
Reference : Peak start and end spectra (integrated) (9.481 / 10.067)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.037 (12 spectra, St.Dev 0.0211 + 3 \* 0.0054)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

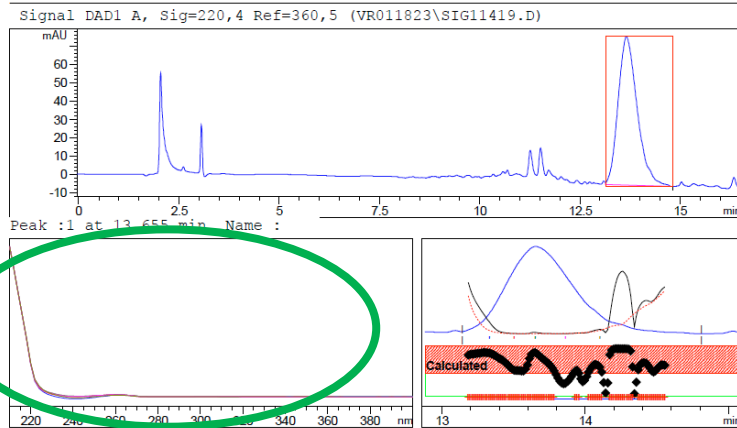
\*\*\* End of Report \*\*\*

**ESS recorded the UV spectra of the samples (green circle), confirming the data reported by the FIP Warriors® research team.**

# UV Measurements Performed by Expert Synthesis Solutions

## GC376 Medkoo standard

Data File C:\CHEM32\1\DATA\VR011823\SIG11419.D  
Sample Name: GC376 dil with Buf, 90:10, 35C, 10µL



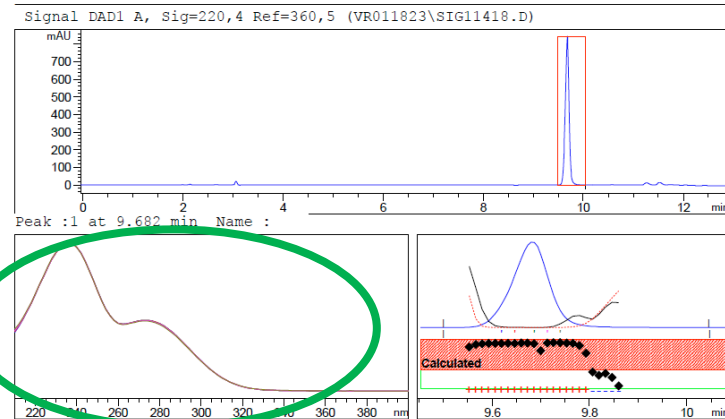
-> The purity factor exceeds the calculated threshold limit. <-

Purity factor : 979.851 (85 of 104 spectra exceed the calculated threshold limit.)  
Threshold : 996.886 (Calculated with 85 of 104 spectra)  
Reference : Peak start and end spectra (integrated) (13.143 / 14.809)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.147 (12 spectra, St.Dev 0.0529 + 3 \* 0.0313)

\*\*\* End of Report \*\*\*

## EIDD-2801 Medkoo standard

Data File C:\CHEM32\1\DATA\VR011823\SIG11418.D  
Sample Name: EDD2801 dil with Buf, 90:10, 35C, 10µL

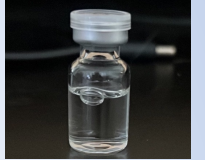


-> The purity factor exceeds the calculated threshold limit. <-

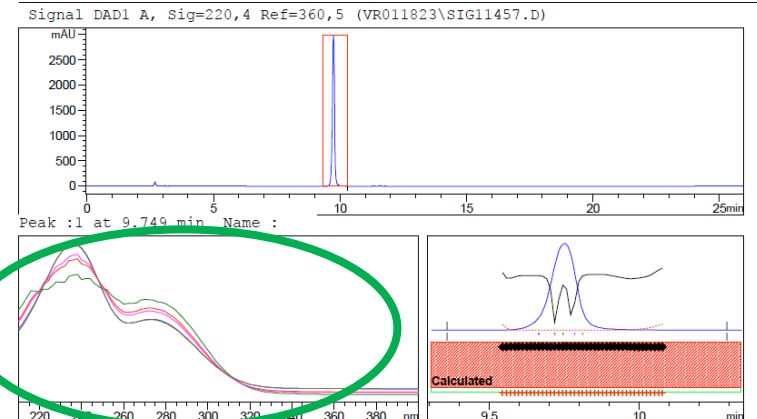
Purity factor : 998.840 (19 of 24 spectra exceed the calculated threshold limit.)  
Threshold : 999.835 (Calculated with 19 of 24 spectra)  
Reference : Peak start and end spectra (integrated) (9.500 / 10.046)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.110 (12 spectra, St.Dev 0.0541 + 3 \* 0.0186)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

\*\*\* End of Report \*\*\*

## The vial of "GC376" from a parent in Canada contains EIDD-2801 instead of GC376



Data File C:\CHEM32\1\DATA\VR011823\SIG11457.D  
Sample Name: GR-TC



-> The purity factor exceeds the calculated threshold limit. <-

Purity factor : 973.445 (41 of 41 spectra exceed the calculated threshold limit.)  
Threshold : 999.965 (Calculated with 41 of 41 spectra)  
Reference : Peak start and end spectra (integrated) (9.359 / 10.292)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.031 (12 spectra, St.Dev 0.0219 + 3 \* 0.0031)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

\*\*\* End of Report \*\*\*

ESS recorded the UV spectra of the samples (green circle), confirming the data reported by the FIP Warriors® research team.

# UV Measurements Performed by Expert Synthesis Solutions

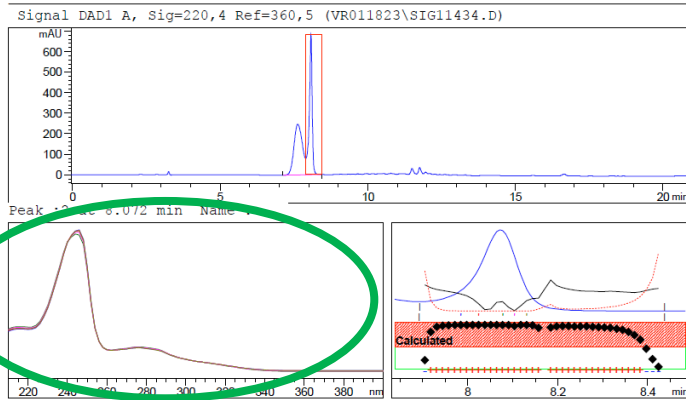
GC376 Medkoo  
standard

EIDD-2801  
Medkoo standard

The vials from SUYI contain  
EIDD-2801 instead of GS-441524



Data File C:\CHEM32\1\DATA\VR011823\SIG11434.D  
Sample Name: GS-441524, Lot#C21R07B12

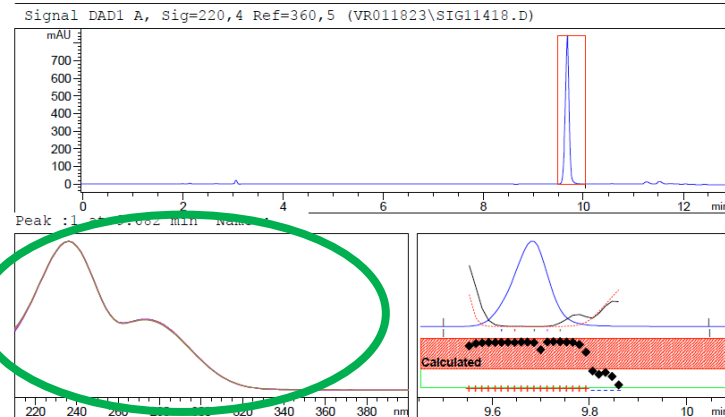


-> The purity factor exceeds the calculated threshold limit. <-

Purity factor : 999.345 (35 of 39 spectra exceed the calculated threshold limit.)  
Threshold : 999.919 (Calculated with 35 of 39 spectra)  
Reference : Peak start and end spectra (integrated) (7.891 / 8.438)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.145 (12 spectra, St.Dev 0.0591 + 3 \* 0.0286)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

\*\*\* End of Report \*\*\*

Data File C:\CHEM32\1\DATA\VR011823\SIG11418.D  
Sample Name: EDD2801 dil with Buf, 90:10, 35C, 10µL

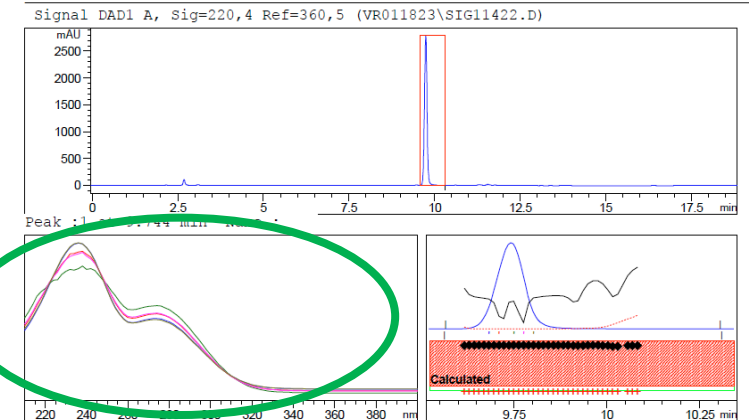


-> The purity factor exceeds the calculated threshold limit. <-

Purity factor : 998.840 (19 of 24 spectra exceed the calculated threshold limit.)  
Threshold : 999.835 (Calculated with 19 of 24 spectra)  
Reference : Peak start and end spectra (integrated) (9.500 / 10.046)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.110 (12 spectra, St.Dev 0.0541 + 3 \* 0.0186)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

\*\*\* End of Report \*\*\*

Data File C:\CHEM32\1\DATA\VR011823\SIG11422.D  
Sample Name: GS-SUYI, clear cap



-> The purity factor exceeds the calculated threshold limit. <-

Purity factor : 963.606 (35 of 35 spectra exceed the calculated threshold limit.)  
Threshold : 999.856 (Calculated with 35 of 35 spectra)  
Reference : Peak start and end spectra (integrated) (9.563 / 10.310)  
Spectra : 5 (Selection automatic, 5)  
Noise Threshold: 0.038 (12 spectra, St.Dev 0.0214 + 3 \* 0.0057)  
Warning : Spectral absorbances > 1000 mAU (see help for more information)

\*\*\* End of Report \*\*\*

ESS recorded the UV spectra of the samples (green circle), confirming the data reported by the FIP Warriors® research team.

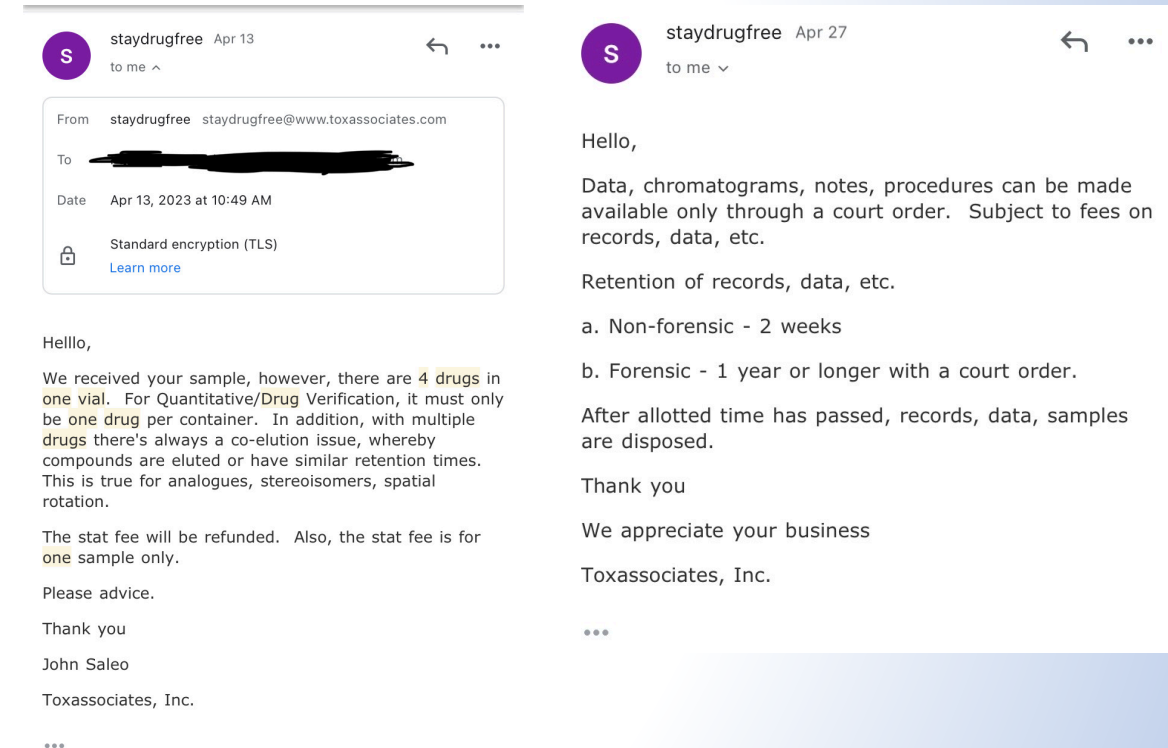


# GC-MS Measurements Performed by Toxicology Associates

Before the samples were sent to ESS for HPLC analysis both FIP Warriors® and FIP Global CATS used Toxicology Associates as external lab for testing. However, further tests proved that the results obtained by that lab were not reliable.

## RED FLAGS:

- They do not request reference standards to compare the results
- They did not request placebos to make sure that there was no interference (when determining the purity)
- Tests are under \$300 for any drug (only the standard may cost \$500 or more)
- They cannot test multiple drugs in the same sample therefore they cannot verify which drug is in the sample- a drug is found and the name provided by the client is assigned as drug name
- They do not provide the raw data as any reliable testing company should
- When 4 vials of the same batch were sent for testing 1 drug per vial they found all the drugs requested at similar purity.



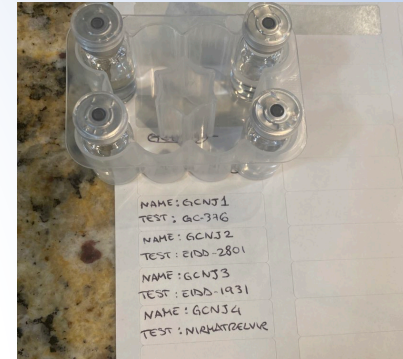
Because we believed that the results from Toxicology Associates were not reliable, the reports of testing for the 2ml "GC376" vials were not divulged by FIP Warriors® in the previous report. Results are shown in the next slides for information purposes only.

# GC-MS Measurements Performed by Toxicology Associates

**DISCLAIMER: the reports on this slide are not reliable and are being shown for information purposes only.**

**ALL THE REQUESTED DRUGS WERE PRESENT  
ACCORDING TO TOXICOLOGY ASSOCIATES. HOWEVER,  
ONLY EIDD-2801 CAN BE SEEN IN THE HPLC.**

Four vials of the new “GC376” were sent for testing to Toxicology Associates in April 2023. Because the company was unable to test 4 drugs in one vial, 4 vials were sent to be tested individually for each drug requested.



**Toxicology Associates**  
1985 Henderson Rd.  
Columbus, OH 43220  
Ph. 614-515-1792, FX. 614-442-0578  
www.toxassociates.com

**Laboratory Report**

Client Name: [REDACTED]

Subject Name: "GCNJ1-GC376"  
Accession #: FR 18856  
Subject ID #: [REDACTED]      Age: [REDACTED]      Sex: [REDACTED]

Date Collected: n/a      Time Collected: [REDACTED]  
Date Received: 4-14-23      Time Received: 0940  
Date Reported: 4-15-23      Time Reported: 1300

Specimen Type: VIAL  
Stat/Routine: STAT

Test	Results	Reference Range
Drug Verification Analysis GC376*	+GC376 95.2%	ND = Non-detect + = Positive

Performed by  
Gas Chromatograph  
Mass Spectrometry

innovative, simple  
[www.toxassociates.com](http://www.toxassociates.com)

**Toxicology Associates**  
1985 Henderson Rd.  
Columbus, OH 43220  
Ph. 614-515-1792, FX. 614-442-0578  
www.toxassociates.com

**Laboratory Report**

Client Name: [REDACTED]

Subject Name: "GCNJ2-EIDD-2801"  
Accession #: FR 18857  
Subject ID #: [REDACTED]      Age: [REDACTED]      Sex: [REDACTED]

Date Collected: n/a      Time Collected: [REDACTED]  
Date Received: 4-14-23      Time Received: 0940  
Date Reported: 4-15-23      Time Reported: 1300

Specimen Type: VIAL  
Stat/Routine: STAT

Test	Results	Reference Range
Drug Verification Analysis "EIDD-2801"	+EIDD-2801 97.65%	ND = Non-detect + = Positive

Performed by  
Gas Chromatograph  
Mass Spectrometry

innovative, simple  
[www.toxassociates.com](http://www.toxassociates.com)

**Toxicology Associates**  
1985 Henderson Rd.  
Columbus, OH 43220  
Ph. 614-515-1792, FX. 614-442-0578  
www.toxassociates.com

**Laboratory Report**

Client Name: [REDACTED]

Subject Name: "GCNJ3-EIDD1931"  
Accession #: FR 18854  
Subject ID #: [REDACTED]      Age: [REDACTED]      Sex: [REDACTED]

Date Collected: n/a      Time Collected: [REDACTED]  
Date Received: 4-14-23      Time Received: 0940  
Date Reported: 4-15-23      Time Reported: 1300

Specimen Type: VIAL  
Stat/Routine: STAT

Test	Results	Reference Range
Drug Verification Analysis EIDD1931	+ EIDD1931 97.7 %	ND = Non-detect + = Positive

Performed by  
Gas Chromatograph  
Mass Spectrometry

innovative, simple  
[www.toxassociates.com](http://www.toxassociates.com)

**Toxicology Associates**  
1985 Henderson Rd.  
Columbus, OH 43220  
Ph. 614-515-1792, FX. 614-442-0578  
www.toxassociates.com

**Laboratory Report**

Client Name: [REDACTED]

Subject Name: "GCNJ4-Nimbrelvir"  
Accession #: FR 18855  
Subject ID #: [REDACTED]      Age: [REDACTED]      Sex: [REDACTED]

Date Collected: n/a      Time Collected: [REDACTED]  
Date Received: 4-14-23      Time Received: 0940  
Date Reported: 4-15-23      Time Reported: 1300

Specimen Type: VIAL  
Stat/Routine: STAT

Test	Results	Reference Range
Drug Verification Analysis Nimbrelvir*	+ Nimbrelvir 97.25 %	ND = Non-detect + = Positive

Performed by  
Gas Chromatograph  
Mass Spectrometry

innovative, simple  
[www.toxassociates.com](http://www.toxassociates.com)

**SAMPLES SENT BY FIP WARRIORS® RESEARCH TEAM**



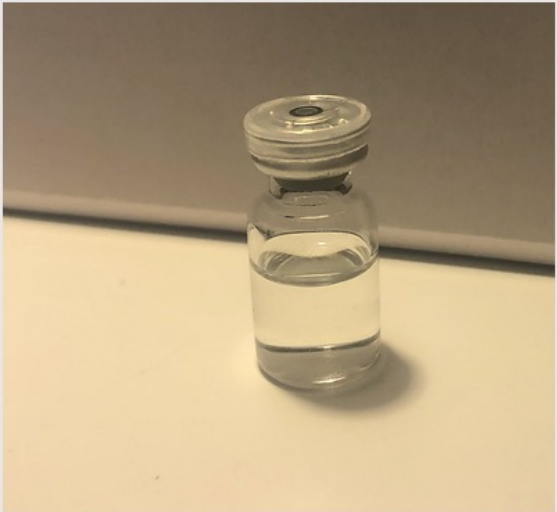
# GC-MS Measurements Performed by Toxicology Associates

**DISCLAIMER:** the reports on this slide are not reliable and are being shown for information purposes only.


**GC376**  
Date Obtained from Vendor: April 2023  
Advertised Strength: 53 mg/ml  
Sold As: 2 mL vial

Notes:

**Test results:**  
Concentration: Not tested  
Purity: 97.65% (+/- 15%)  
pH: Not tested  
Testing Lab: Toxicology Associates  
Testing Method: GCMS  
Date Tested: 5/22/2023  
Other Testing Results/Notes:  
This sample was also tested for the presence of GS-441524 and Molnupiravir (EIDD-2801). None was detected.



**FROM  
FIPSAFE.ORG**



1985 Henderson Rd.  
Columbus, OH 43220  
Ph. 614-515-1792, FX. 614-442-0578  
[www.toxassociates.com](http://www.toxassociates.com)

Laboratory Report

Subject Name: 2m5-1  
Accession #: MO 18865  
Subject ID #

Age:  
Sex

Date Collected: n/a  
Date Received: 5-15-23  
Date Reported: 5-22-23

Time Collected:  
Time Received: 0920  
Time Reported: 1445

Specimen Type: vial-liquid  
Stat/Routine: routine

Test	Results	Reference Range
Drug Verification Analysis		
a. Qualitative Analysis		
ND = Non-detect + = Positive		
1. GS-441524	< 5.0 ng/ml. Limit of sensitivity. Therefore, Non-detected	Performed by Gas Chromatograph Mass Spectrometry
2. EIDD-2801	< 5.0 ng/ml. Limit of sensitivity. Therefore, Non-detected	
b. Quantitative Analysis		
GC-376	+ GC-376 97.65 % Tolerance = +/- 15 %	

innovative, simple  
[www.toxassociates.com](http://www.toxassociates.com)

SAMPLE SENT BY FIP GLOBAL CATS

fipsafe.org

# Reported Incidents with the New “GC376”



The vial of “GC376” from a parent in Canada contains EIDD-2801 instead of GC376

**Cat #1** in Canada was initially treated with EIDD and Spark oral GS. Oral GS was interrupted but because the cat experienced seizures, oral treatment with GS was resumed. The WBC count was normal on CBC. Two days after the bloodwork, EIDD was stopped and substituted with injections of the new “GC376” at 20mg/kg BID. The cat experienced seizures again after a week and the dosage of both drugs was increased to 60mg/kg oral GS and 50mg/kg BID “GC376”. The WBC count was low and the vet suspected that the treatment was the cause. The cat passed away of cardiac arrest. The parent donated the vial that was sent to ESS for HPLC testing, proving that the main active ingredient was EIDD-2801.

**Cat #2** in Canada exhibited an initial improvement on these vials at 20mg/kg BID and oral GS-441524. The dosage was increased to 40mg/kg BID due to decline after switching to another brand of real GC376. Treatment with the new “GC376” was resumed after few days. The dosage of “GC376” was raised again (60-70mg/kg BID). The cat exhibited droopy ears, hair loss, weight loss and low WBC count. The brand of GS was changed but the cat continued to decline and the ears did not go back to normal as it is seen when stopping EIDD within 2-3 weeks. The cat was humanely euthanized after a month.

HEMATOLOGY		CHEMISTRY	
TEST	RESULT	TEST	RESULT
RBC	8.8	H Glucose	14.7
Hemoglobin	0.36	IDEXX SDMA <sup>®</sup>	9
Hematocrit	118	Creatinine <sup>®</sup>	85
MCV	41.9	Urea (BUN)	8.6
MCH	13.7	BUN Creatinine Ratio	26
MCHC	327.8	H Phosphorus	2.3
RDW	20.1	L Calcium	2.6
% Reticulocytes	3.2	Sodium	152
Reticulocytes	17.2	Potassium	4.0
L Reticulocyte Hemoglobin	14.7	Na:K Ratio	38
L WBC <sup>+</sup>	1.1	L Chloride	111
% Neutrophils	86.0	H TCO2 (Bicarbonate)	39
% Lymphocytes	10.0	Anion Gap	12.25
% Monocytes	2.0	Total Calcium	156
% Eosinophils	1.0	Total Anion	141
% Basophils	1.0	L Total Protein	45
% Nucleated RBC	2.0	L Albumin	22
L Neutrophils	9.9	L Globulin	23
L Lymphocytes	9.1	Albumin: Globulin Ratio	1.0
Monocytes	0.0	ALT	79
Eosinophils	0.0	AST	27
Basophils	0.0	ALP	12
Nucleated RBC	2.0	CST	0
Platelets	312	Bilirubin - Total	1.5
Platelet Comments	Platelet assessment Adequate	H Creatine Kinase	860
CBC Comment	Manual Differential performed. RBC, WBC, and platelet morphology normal	H Osmolality	214
		Hemolysis Index	Normal
		Icterus Index	Normal
		Lipemia Index	Normal

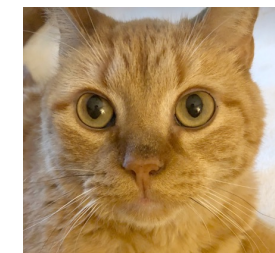
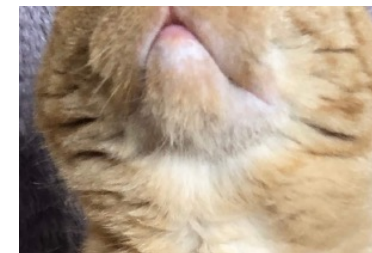
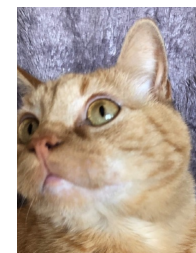


25<sup>th</sup> February 2023 (switched GS brand)



March 16<sup>th</sup> 2023 (the ears continued to fold)

**Cat #3** in USA received a combination of oral GS-441524 and the new “GC376” at 20mg/kg BID for 2.5 months then 30mg/kg BID for 2 weeks. The cat showed hair loss under the chin and whiskers loss which resolved in observation. Unfortunately, the cat relapsed with weight loss, depression and AKI. Cat n. 3 is currently undergoing treatment for the third time.



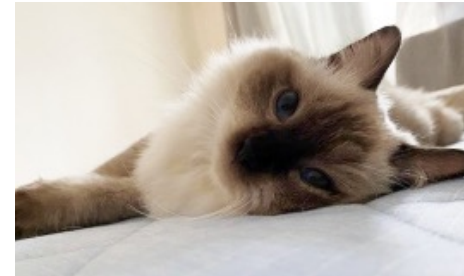
Whiskers grew back after coming off EIDD-2801 (“new GC376”)

# Reported incidents with SUYI



The vials from SUYI contain  
EIDD-2801 instead of GS-441524

**Cat #1** in Korea showed droopy ears after 2 months of administration at 1pill/kg (pills were labeled as 40mg or 60mg- the actual amount of the drug has not been tested yet). Owner reported that droopy ears is a common side effect noted with SUYI in Korea and that it was reported by many parents. Owner reduced the dosage and the ears returned normal within days.



Cat #1 on SUYI pills

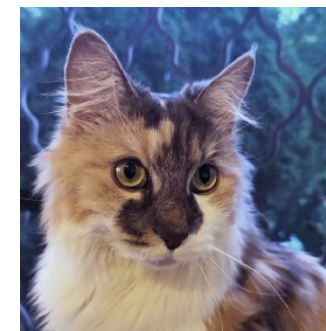
**Cat #2** in Hungary exhibited droopy ears and low WBC/Neu. The admin following the parent reported that the cat showed droopy ears on day 70 of relapse treatment at 17mg/kg of SUYI injectable sold as 20mg/ml GS-441524 (40mg/ml EIDD tested in lab). Therefore the estimated dosage of EIDD was about 34mg/kg. Few days later bloodwork showed low WBC, neutrophils, lymphocytes and monocytes. The cat was put on antibiotics to prevent infections and switched to another brand of GS-441524 to continue treatment. Ears went back to normal and WBC increased after 2-3 weeks.

## Cat #2 CBC

Fehérvérszám (WBC)	---	2.3	G/L	6.0 - 15.0
Neutrophil abs. (Advia 120)	---	0.8	G/L	3.1 - 12.5
Lymphocyt abs. (Advia 120)	-	1.40	G/L	1.50 - 7.50
Monocyt abs. (Advia 120)	-	0.00	G/L	0.15 - 1.10
Eosinophil abs. (Advia 120)		0.10	G/L	0.06 - 2.21
Basophil abs. (Advia 120)		0.00	G/L	- 0.08
Large Unstained Cells abs. (Advia 120)		0.00	G/L	- 0.26



Cat #2 on  
SUYI injections



Cat #2  
3 weeks after  
interruption of  
SUYI injections



# CONCLUSIONS

The following vials were found to contain **EIDD-2801** instead of the advertised drugs:

- “GC376” 2ml vial
- SUYI injectable (pills will be tested soon)
- Chariot
- PetHealthFIP
- Cat rehabilitation nutrition supplement- appetizer (sold with syringe)
- Purple Cap vials by Susan (XUN HE-connected to Ruiyao Biotech)
- 10ml vial labeled as 1,2-Dihydroxypropane

Expert Synthesis Solution (ESS) performed the HPLC analysis and the UV spectrophotometric analysis confirming the results previously divulgated by FIP Warriors®

Brands advertising their products as “water-based”/“painless”/high pH GS-441524 should be avoided

Sellers are warned that products will be periodically tested and that EIDD-2801 should not be used instead of GS-441524, which remains the safest drug for treatment of FIP

# Resources & Contacts

Please join **FIP Warriors® Research and Data** to stay up to date with tests and the research:  
<https://www.facebook.com/groups/fipwarriorsresearch>



If you used or are using one of the brands mentioned in this report please contact your admin or the research team at [FIPwarriors.data@gmail.com](mailto:FIPwarriors.data@gmail.com)

**DO NOT STOP TREATMENT WITHOUT DISCUSSING WITH YOUR VETERINARIAN AND YOUR ADMIN**

Some vials containing EIDD-2801 instead of GS-441524 can be recognized by the color (clear vs light yellow tinge) and the smell ("disinfectant" vs ethanol).

