Isavuconazonium sulfate (BAL8557) Invasive Fungal Disease ISN 9766-CL-0046

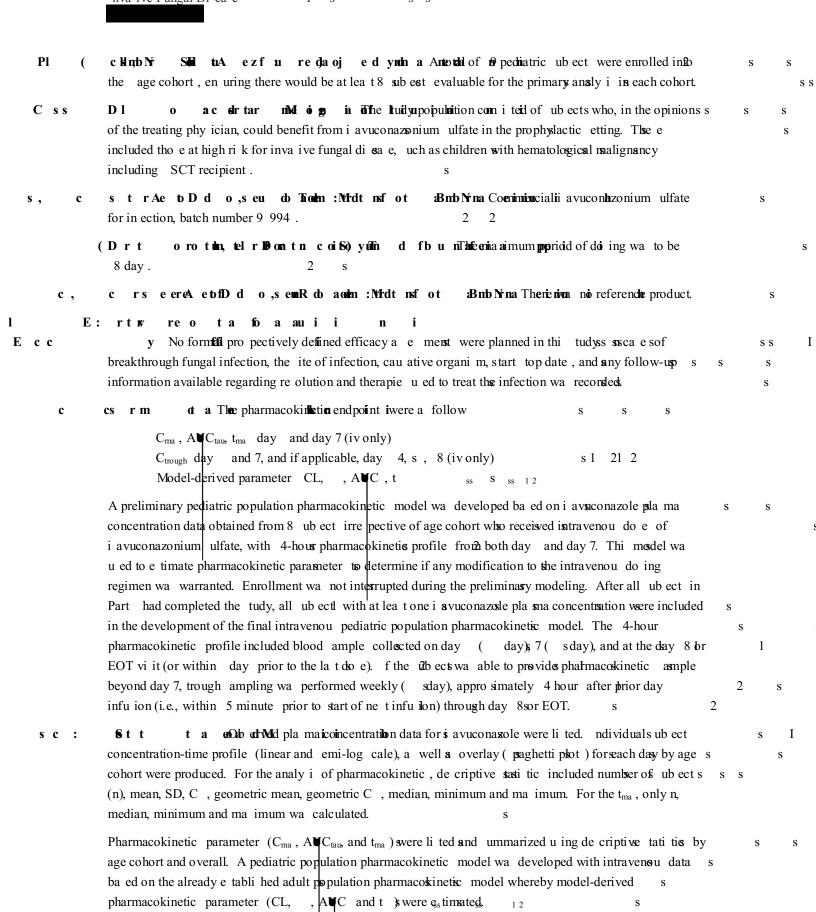
Name of Sponsor/Company: Astellas Pharma Global Development, Inc.		
Name of Finished Product: Isavuconazonium sulfate	,	
Name of Active Ingredient: Isavuconazole		

# **SYNOPSIS**

Title of Studen A Phone I Own I shal Multiconton Non someontine Pharmacalinetics and Section Control

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Autotal coan 9 ub port we me enroilled in thi tudy, and ensrolled ub ect were snot given tudy drug. Twenty- even ub ect were given at lea tones do e sof tudy drug (con tituting the afesty analy i et SAF). Of the SAF, 6 ub ect provided at lea t one valid pharmacokinetic mea usement (con tituting the pharmacokinetic analy i et P AS), and 4 ub ect completed the tudy Table s.

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u R n

The demographic characteri tic of the ub ect are de cribed in \$\ \footnote{S}\ able \quad . The ubsect were predominately 2 male ( ub ect, 7 ) and white (8 ub edts 6 )s with age ranging from to s 7 year.

The primary underlying diagno e of the ub ect are hown in Tables. Acuse myelogenou leukemia wa the mo t common diagno i (0 ub ect, 7s), followed by neuroblastoma (st ub ect, 4.8) and apla tis anemia s ( ub ect, . s 11 1 S

All (99) ub ect in Cohort and all but (68s) ub est in Cohoilt were 402kg in weight and were do2ed at 0 mg kg all (0 0) ub ect in Cohort weighed thorte than 40 kg and were do ed at 7 mg.

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Efficacy No breakthrough infection were ob erved.

Pharmacokinetic A ummary of Ctrough value on day and 7 are hown in Table 4.A summary of pla ma pharmacokinetic parameter of i avuconazole after multiple do isng i spre ented by age group and day in s Table 5. Within each age cohort, there wa a tendency for C<sub>ma</sub> and A \ \ C<sub>tau</sub> value to be lightly higher at day than at day 7. The median t<sub>ma</sub> wa imilar acro all age group. Whe is comparing assro age cohors, on day the mean  $A \Psi C_{tau}$  and  $C_{ma}$  were comparable for Cohort and and were approximately 0s lto 52 lower for Cohort . On day 7 the mean AUC<sub>tau</sub> and C<sub>ma</sub> decrea ed a age increa ed.

A population pharmacokinetic model wa developed from Part of Study 9766-CL-0046 for the intravenou admini tration of i avuconazonium ulfate. Due to limited number of pharmacokinetic ample, the data from Study 9766-CL-0046 were combined with that of 6 ub ect from Part of Study 9766-CL-00 &swho were 2 admini tered a ingle do e of 7 mg of i avsuconazonium ulsate (iv)2including 8 adult ub ects with varying degree of renal impairment and 8 adult healthy ub ect.

Ba ed on modeling and imulation re uls, the propo ed dailysdo e for the slinscal tudy is pediatric patient i

0 mg kg i avuconazonium ulfate for patient weighing 7 kg sthe ma imum losding and daily maintenance do e to be admini tered to any patient are 7 mg),

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7 mg i avuconazonium ulfate for pat2ent weighing 7 kg.s

Detail of the modeling and imulation procedure and re ult are available in a eparate population pharmacokinetic modeling report.

Ba ed on noncompartmental analy i of sparameter on day and day 7, Cohort appear to have lower C<sub>ma</sub> and AUC a compared to Cohort and , however the e parameter snight not be at teady state. Pla mas concentration data from thi tudy will be u ed to upport a population pharmacokinetics model developed for i avucdnazole and for pharmacokinetis pharmacodynamic modeling. The re ult and the model development will be de cribed in detail in the population pharmacokinetic report i ued eparately from thi CS.

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nva ive Fungal Di ea e

et aEvent from uEOT viit thRet occurred on caneduled viit days were diplayed under Day 8 EOT rather than the cheduled vi 2 day. s

An overview of TEAE i hown in Table 6. The TEAE occurring at the fre uency of at least 0 of ub ect (i.e., ) at the PT level in any inglestreatment cohort i hown in Table 7. The TEAE wishs the highe t fre uencie were pyre ia (5.9), snuco al inflammation (44.4), diarrhea (s.), thrombocytopenia, anemia, abdominal pain, epi ta i and pain in e tremity ( . each).s Only ub ect in Coho2t 2e perienced AE in the SOC of n ury, poi oning and sprocedural complication is Otherwie, there were no obvious difference between the age group.

TEAE in 7 of ub ect (0 7) were considered at less t po siltly related to tursty drug. Table 8 .ssThe drugrelated TEAE occurring mo t fre uently were infusion related reaction, procedural nau sea, and procedural vomiting, each reported for ( . ) ub ect in Cohort . n the offee cohort , nos TEAE wal elen in more ub ect. Study drug-related TEAE 1were low in all cohort.

7) of ub ect e perienced an SAE2 Overald, the moot fre uent SAE were diarrhea and s Overall, 44.4 ( pyre ia ( ub ect each), followed by felbrile nesutropersia, abdominal pain, muco al inflammation, and cytomegaloviru infection (7.4 ub ect each). The number2of SAE sfor indsvidual event wa very low. s

Only SAE (electrocardiogram T prolonged) was considered at least possibly related to tustly drug. This SAE re ulted in di continuation of tudy drug on day 8.s

AE re ulting in di continuation were reported for ubsect Table 9. 2 s

n thi tudy, multiple intravenou do Ie of sis avuconazole were generally safes and swell tolerated by male and s female ub ect in all age cohort, with a afesty profile which wa imilar to adult. SS

#### **UO** 0 NS SNLI

Thi wa the fir t tudy in which the afesty and pharmasokinetic of i avusonazonium ulfate wa formally inve tigated in children.

On day  $% \left( C_{ma}\right) =0$  ,  $C_{ma}$  and  $A\Psi C_{tau}$  were comparable for Cohort  $% \left( C_{ma}\right) =0$  , but were lower for Cohort s .10n  $^{2}$ day 7, A \ C<sub>tau</sub> and C<sub>ma</sub> decrea ed with increa ing age. A population pharmacokinstic model wa developed to determine appropriate do ing regimen in children.

avuconazonium ulfate wa generallsy afe and well-toderated in thi tudy, with an overall AE SS fre uency that wa imilar to what wa ob erved in adults. The fre uency and type of AE observed wa e pected ba ed on the underlying medical condition of the tudy population. No obviou difference in overall and individual stype AE wa observed between the age colsorts Study drug wa withdrawn in ub ect due to liver to icity, and in 1 sub ect due to T prolongation. Two ub ect e perienced mild events but tisdy drug wa not wilthdrawn by the sprincipal inve tigator.

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All regi tered ub ect. s s

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(9.)

Safety analy i et all regi tered ub ect who received at lea t s do e of tudy drug. Pharmacokinetic analy is et all regi tered ub ect who took as lea t one do e of tudy drug and who had at lea toone pla ma concentration mea urement.

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`	Stati tic ( S S) (	= ) (	) n	(11 ) n	11	1
)	S e n	7(6.6)	6 (75.0)	8 (80.0)	(7.4)	
	Female	4 ( 6.4)	(5.0)	( 0.0)	82( 27.6)	2 2
( c	t ty n mii		, ,		,	
	Not i panic or Latino s	4 ( 6.4)	(5.0)	4 (44.4)	<b>Q</b> (25.7)	
	i panic or Latino s	7 (6 .6)	6 (75.0)	5 (55.6)	8 (64. )	
	Mi ing ss	0	0			1
c )	e a nR					
	White	5 (45.5)	7 (87.5)	6 (60.0)	8 (6 . )	
	Black or African American	( 7. )	( .5)	(20.0)	51(172)	1 1
	A ian s	(9. )	0	( 0.0)	(6.9)	1 1
	American ndian or Ala ka Native I	0 <sub>s</sub> (9. ) (9. )	0	0	0	
	Native awaiian or Pacific lander	(9. ) Is	0	1 0 1	( .4)	2.2
	Other	(9. )	0	<b>(</b> 0. <b>0</b> )	( 0. )	2 2
S	yree a g					
	Mean (SD)	. ( . )	9.0 ( .7)	4.62(1.8)	8.7 (51)	1 1
	Median	.0	9.5	4.5	9.0	1
	Min - Ma	5	6	1 7	171	12 1
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	Mean (SD)	5.8(.)	.8 ( 6.06)	<b>69</b> . 1 ( 9.1 <b>5</b> )	8.9 1( 17. )	1 1
	Median	5.60	.7	65.85	280	
	Min - Ma	9.0 9.	8.6 67.4	4.4 0.5	910 0.5	2 1

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	rmtr eæa	C		C	C rto		rto o	1 h rto o		h
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)	t em			igh						
	Mean (SD)				97. ( .7	76) 6.0	5 ( 7.5 )	67.206 (1915	1 4.6 ( 1. 4)2	1
	Median				96.50		4.75	6 .75	1 9.00	1 2
	Min - Ma				77.0 .	0 6.0	0 67.9	57.4 181.0	0.8 0.77	1 1
)	Bm N	11	k	g				_		
	Mean (SD)			C	6.9 ( .5	8) 7.	7 ( .59)	4. 92(425)	9.79 (5.05)	2
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	st my e oeue m	e e u	u na 4 <b>g</b> 4k.4)	i (5.0)	4 (40.0)	2 20 ( 7.0)	
	t mae a p	oa n	i 0	(5.0)	( 0.0)	2 2 ( . )	1 1
	mm rentd ude	n	i ( . )	0	1 11 10	( .7)	
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All regi tered ub ect.

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Table continued on next page

Source End-of-Te t Table

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diopathic apla tic anemia,  $\,$ -linked adrenoleukody strophy, hemophagocytic lymphohi tiocyto i, acute lymphocytic leukemia relap e, acute myelobla tic leukemia, evese combined immusnodeficiency di ea e. Meta tatic Ewing arcoma. s s s

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		•	n	9		8	8
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С	5 .5	56.7 1	4 .6
Median	6 0	400 1	80 2
Min Ma	40 5950	770 5 1 10	7 0 4960 2

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P AS all ub ect who took at lea t do e of sudy drug and who havesatllea st pla ma concentration. Patient received 6 loading do e of i avuco sazonium ulfate at 0 sng kg (sif weight 40 kg) or at 71 mg (if weight 40 kg) on day and, and on day to 8 received 10 mg/kg or 7 mg, re pectively, once daily.

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C coefficient of variation Geo geometric Min minimum Ma ma imum P AS pharmacokinetic analy i et. s s s

Source End-of-Te t Table .4.

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P AS all ub ect who took at lea t do e of sudy drug and who havesat lea s pla ma concentration. Subject received 6 loading do e of a vucosazonium ulfate at 0 sng kg (if weight 40 kg) or at 71 mg (if weight 40 kg) on day and, and on day to 8 received 10 mg/kg or 7 mg, re pectively, onte daily. C coefficient of variation Geo geometric Min minimum Ma ma im m P AS pharmacokinetic analy i et. s s s

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Source End-of-Te t Table .4.

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(	)	( )	( n)	n	n
y n	T	7 (77.8)	8 ( 00.0)	0 ( 00.0)	1 5 (9 .6)
DrEsr t e eud a	g	T( . )	( 7.5)	4 (40.0)	0 ( 7.0)
s Sr o u	i T	( . )	4 (50.0)	5 (50.0)	(44.4)
Der srEtEs e Sreud ao	ug	(i) T	0	( 0.0)	( .7)
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SAF all regi tered ub ect who received at lea t s do e sof tudy drug. A TEAE was defined a an AE ob erved after tarting admini tration of the tudy drug through follow-up. AE adver e event SAE eriou adver e event SAF afety analy i et TEAE treatment-emergent advers e event.

A rea onable po ibility that the event may have been sau ed by the tudy drug at a e ed by the inve tigator. f relation hip i mi ing them it i colli idered as drugs-related.

nclude SAE upgraded by the pon for ba est on review of the pon or bit of salway Seriou tearns, if anys s upgrade wa done.

All reported death after the fir t tudy drug admini tration. 12 11

Source End-of-Te t Table .6. .

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	Tachycardia	( . )	( 5.0)	(10.01) 1	5 (28.3)	2 2
l s s		i i				
	Diarrhoea	( . )	4 (50.0)	(20.20) 2	9( . )	
	Abdominal pain	( . )	( 5.0)	(10.0) 1	6 (2 .2)	
	Contipation s  s r e ers rod asde mindtrol a to i i	nae n	ini i i	( 0.0)	(7.4)	2 2
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	Pyre ia	4 (44.4)	5 (6 .5)	5 (50.0)	4 (5 . 2)	
	Muco al inflammation s	5 (55.6)	4 (50.0)	( 0.0)	(44.4)	
	Fatigue	( . )	( .5)	(10.01) 1	5 (18.53)	
s s	sam syt seal eu sod den	i				
			s s( 5.0)	( 0.0)	5 (28.3)	
		( /	s ( .5)	(20. <b>D</b> ) 2	4 (14.83)	1 1
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c s	s t seo I ft d æno fia nin	in i	( -	(10.00 1	4 / 1 4 0 0	
	Clostridium difficile infection	( . )	( .5)	(10.0) 1	4 (14.82)	2 2
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	uman herpe viru 6 infection  Cytomegaloviru infection	6) s 0 s	0 ( .5)	( 0.0)	(1 .1 3)	2 2 2
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c c s	mot o a p ni i	u pg				
	nfu ion related reaction I s	( . )	0	<b>2</b> 0 22 2	(7.4)	
	Procedural nau ea	( s )	0	20 22 2	(7.4)	
	Procedural vomiting	( . )	0	20 22 2	(7.4)	
s v s	t te oI a n nig i	T				
	Electrocardiogram T prolonged	0	0	( 0.0)	(7.4)	2 2
	White blood cell count decrea ed	( . )	<b>S</b> )	(10.01) 1	( . )	2 2
	Activated partial thrombopla tin time prolonged	0	s 0	( 0.0)	(7.4)	2 2
	Prothrombin time prolonged	0	0	( 0.0)	(7.4)	2 2
S	tbenne Matrtdaornod melin	n i i	i			
	ypomagne aemia	<b>(</b> . )	( .5)	(10.DI) 1	5 (18.53)	
	yperglycaemia	( . )	0	(10.01) 1	( . )	2 2
	ypoalbuminaemia	( . )	0	(20. <b>D)</b> 2	( . )	1 1
l sc s s s	c cot Meseuvu oda atek e ne r nod de i	nn u	i i			
	Pain in e tremity	( . )	( .5)	4 (40.01) 1	6 (1 .12)	
	Arthralgia	0	0	( 0.0)	( . )	
	Back pain	0	0	( 0.0)	(7.4)	2 2
s s sv	sr Nseytm e und de	i		Т		
	eadache	( . )	( .5)	20 22 2	(1 .13	
	Table continued on next page					

Dec 0 9 2 1 A tella Synops i Page 9 of

Source End-of-Te t Table .6. .

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	yperten ion	s ( . )	(5.0)	10 11 1	(2.2)	*
	SAF all regi tered ub ect who received at lea ob erved after tarting admini tration of the tu ub ect may have reported more than prefiger	dy drug through				s

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Source End-of-Te t Table .6. .

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