



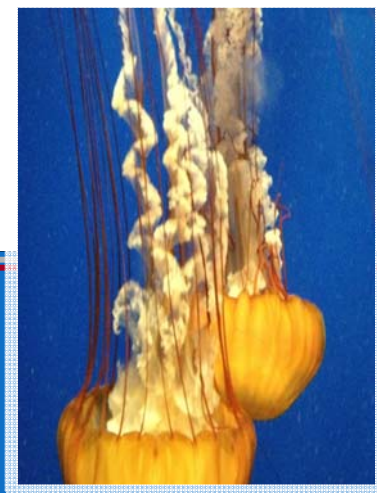
BHIVA 'Best of CROI' Feedback Meetings

*London | Birmingham
Haydock | Wakefield | Newcastle
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BHIVA 'Best of CROI' Feedback Meetings 2013

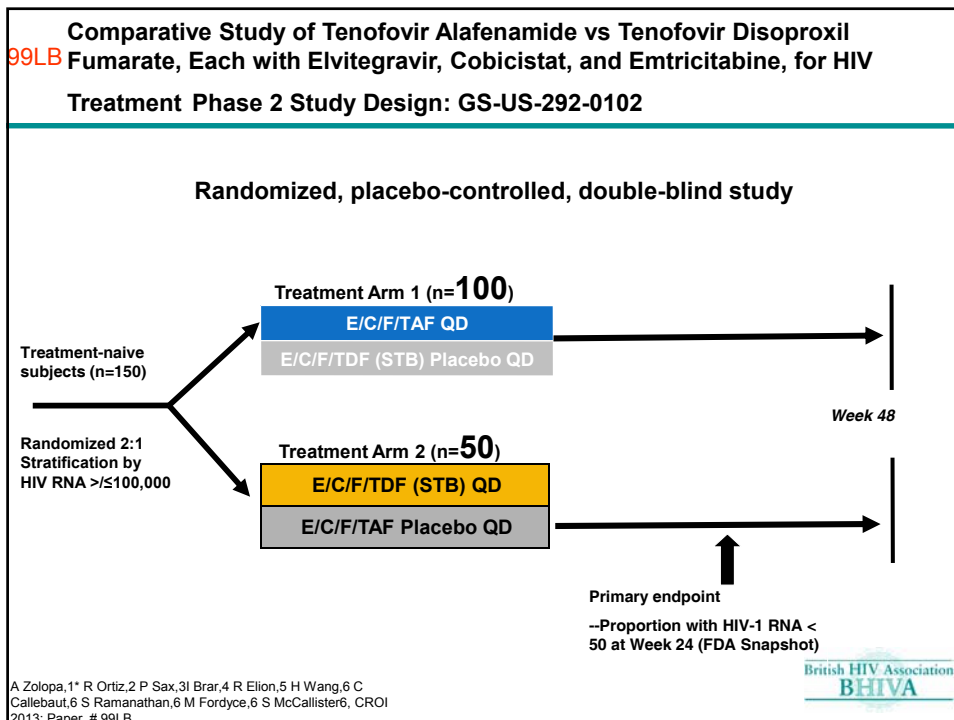


BHIVA Best of CROI- novel ART & strategies



Emerging Therapies

Name	Phase	NNRTI	NRTI	2 nd Generation Maturation Inhibitor	CCR5/CCR 2 antagonist	HDAC inhibitors	LEDGF/p75 (early integration) inhibitors
Tenofovir Alafenamide (TAF)	2		✓				
MK – 1439	2b	✓					
Bevirimat Analogues	Pre-clinical			✓			
Cenicoviroc	2b				✓		
Vorinostat	2a					✓	
LEDGIN							✓



Tenofovir Alafenamide (TAF)

Next Generation Prodrug of Tenofovir-increased liver, lymph concentration

NC1=NC=NC2=C1N=CN2COP(=O)(O)O
TFV
 Tenofovir

CC(C)OC(=O)COP(=O)(OC(C)C)OC(C)COP(=O)(O)C1=NC=NC2=C1N=CN2
TDF
 Tenofovir Disoproxil Fumarate

CC(C)OC(=O)COP(=O)(OC(C)C)OC(C)COP(=O)(O)C1=NC=NC2=C1N=CN2C3=CC=CC=C3
TAF
 Tenofovir Alafenamide

TAF 10mg in E/C/F/TAF has PK comparable to TAF 25mg alone²

-COBI ↑ TAF levels ~2.2-fold

Relative to TDF 300 mg, TAF 25 mg has¹:

- Increased anti-HIV-1 activity in Phase 1
- Increased intracellular TFV-DP levels by ~7-fold
- Decreased circulating plasma TFV levels by ~90%
- Lower levels of TFV in kidney and bone tissue expected

¹P Ruane, et al. CROI 2012; Paper # 103

²S Ramanathan, et al. IWCPHT 2012; Abstract O_13

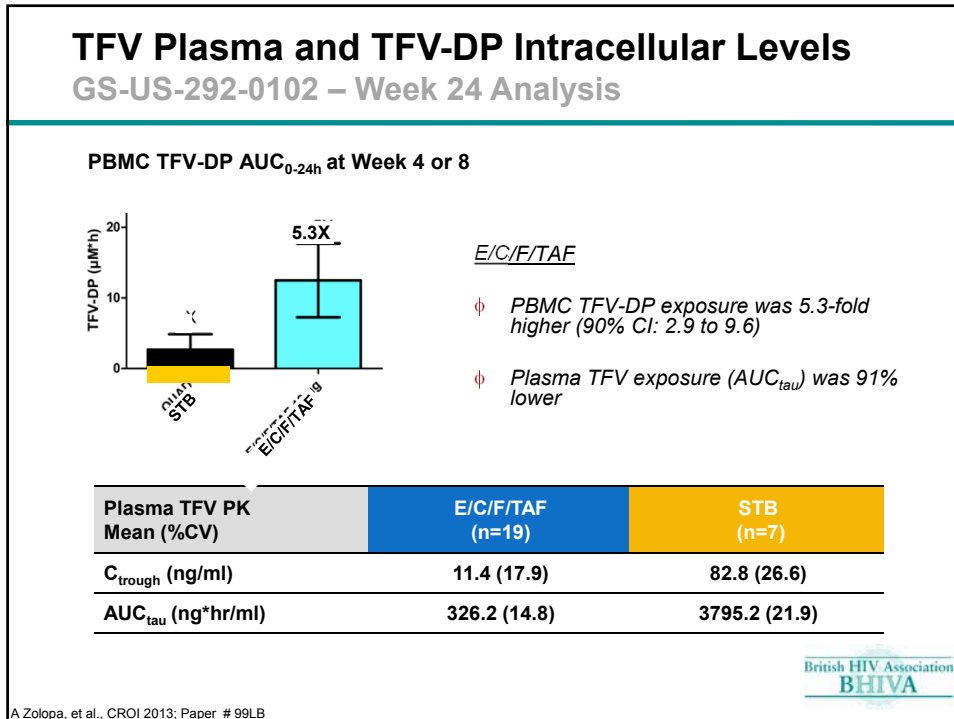
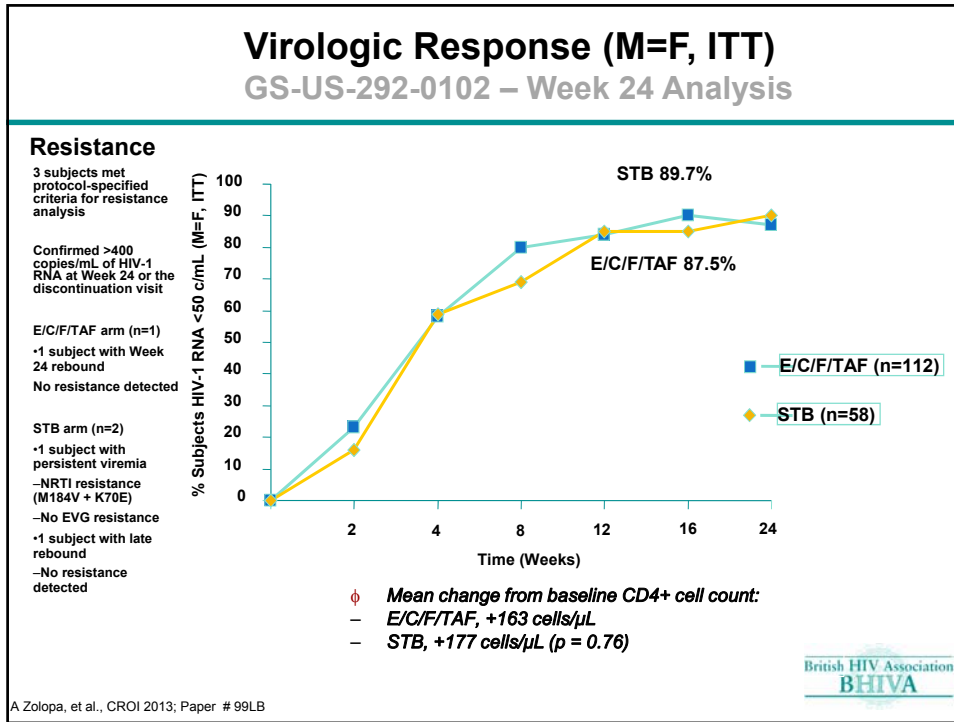
A Zolopa, et al., CROI 2013; Paper # 99LB

Baseline Characteristics

GS-US-292-0102 – Week 24 Analysis

Characteristic	E/C/F/TAF (n=112)	STB (n=58)
Age (years), Median	34	38
Male	96%	98%
White Race	67%	69%
Black Race (or African Descent)	30%	28%
Other Race	3%	3%
Hispanic or Latino Ethnicity	22%	19%
Asymptomatic HIV Infection	88%	91%
HBsAg, HCVAb Seropositive	0, 0	0, 0
HIV-1 RNA (log ₁₀ c/mL), Median	4.55	4.58
> 100,000 c/mL	17%	28%
CD4 count (cells/mm ³), Median	385	397
≤ 200	13%	19%
Estimated GFR (mL/min), Median – Cockcroft-Gault	115.2	113.3

A Zolopa, et al., CROI 2013; Paper # 99LB



Adverse Events

GS-US-292-0102 – Week 24 Analysis

Adverse Events occurring in at least 5% of subjects in E/C/F/TAF	E/C/F/TAF (n=112)	STB (n=58)
Any AE	91 (81%)	47 (81%)
Nausea	20 (18%)	7 (12%)
Diarrhea	13 (12%)	7 (12%)
Fatigue	13 (12%)	5 (9%)
Headache	11 (10%)	6 (10%)
Upper Respiratory Tract Infection	8 (7%)	7 (12%)
Flatulence	6 (5%)	2 (3%)

ϕ More than 90% of AEs in both arms were Grade 1 or 2

ϕ There were no treatment-related SAEs in either arm



A Zolopa, et al., CROI 2013; Paper # 99LB

Grade 3 or 4 Lab Abnormalities

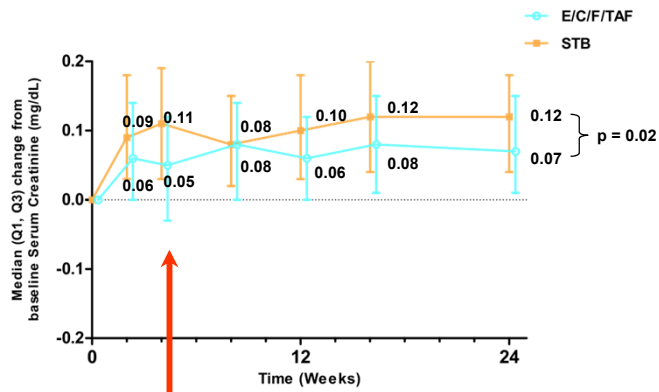
GS-US-292-0102 – Week 24 Analysis

Maximum Toxicity Grade Post-Baseline, n (%)	E/C/F/TAF (n=112)	STB (n=58)
Any G3 or G4 abnormality	19 (17%)	8 (14%)
LDL	7 (6%)	2 (3%)
Neutropenia	5 (5%)	1 (2%)
White Blood Cells	1 (1%)	0
Amylase	2 (2%)	1 (2%)
Creatine Phosphokinase	6 (5%)	2 (3%)
Glucose	0	1 (2%)
Total cholesterol	1 (1%)	0
Triglycerides	1 (1%)	1 (2%)

Assessment (median increase)	E/C/F/TAF (n=112)	STB (n=58)	p-value
Total Cholesterol (mg/dL)	31	15	<0.001
LDL (mg/dL)	17	4	0.001
HDL (mg/dL)	6	2	0.007
TC:HDL ratio	0.1	0.1	0.47
Triglycerides (mg/dL)	24	21	0.48
Fasting serum glucose (mg/dL)	3	3	0.78

A Zolopa, et al., CROI 2013; Paper # 99LB ϕ There were more subjects with neutropenia in the E/C/F/TAF arm at baseline

Median Change in Serum Creatinine GS-US-292-0102 – Week 24 Analysis

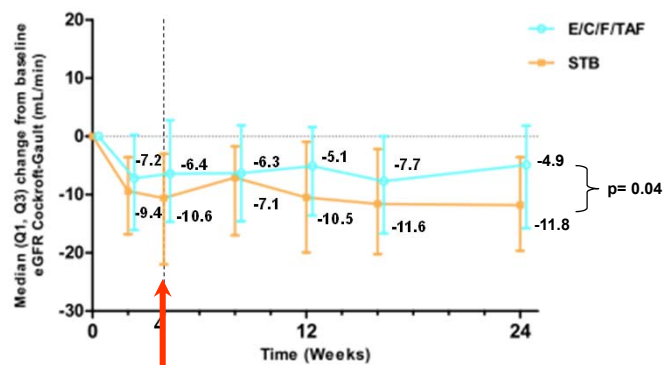


- φ **Change in serum creatinine at Week 24**
- E/C/F/TAF: 0.07 mg/dL
- STB: 0.12 mg/dL (p=0.02)

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A Zolopa, et al., CROI 2013; Paper # 99LB

Median Estimated GFR (Cockcroft-Gault) GS-US-292-0102 – Week 24 Analysis

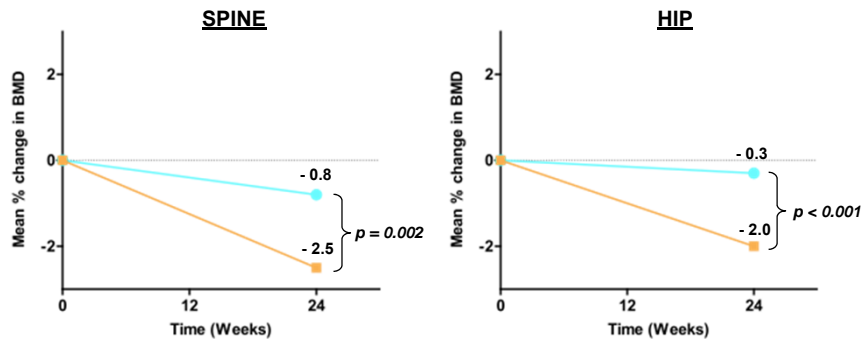


- φ **Change in eGFR at Week 24**
- E/C/F/TAF: -4.8 mL/min
- STB: -11.8 mL/min (p=0.04)

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A Zolopa, et al., CROI 2013; Paper # 99LB

Percent Change in Bone Mineral Density (DEXA) GS-US-292-0102 – Week 24 Analysis



- φ **Proportion of subjects with no decrease in BMD**
- Spine: E/C/F/TAF, 38%; STB, 12%
 - Hip: E/C/F/TAF, 41%; STB: 23%

Naïve trials

Efficacy and Safety of Elvitegravir/Cobicistat/Emtricitabine/Tenofovir DF Integrated Week 96 Analyses

Poster 553

A Zolopa¹, JK Rockstroh², C Orkin³, HJ Stellbrink⁴, S Walmsley⁵, D Cooper⁶, L Zhong⁷, M Fordyce⁸, MS Rhee⁹, J Szwarcberg¹⁰

¹ford University, Palo Alto, CA, US; ²University of Bonn, Bonn, Germany; ³Barts and the London NHS Trust, London, UK; ⁴ICH Study Center, Hamburg, Germany; ⁵Toronto General Hospital, Toronto, Canada; ⁶St Vincent's Hospital, Sydney, Australia; ⁷Gilead Sciences, Foster City, CA, US

Figure 3. Efficacy Endpoint: HIV-1 RNA <50 c/mL

Methods

Figure 1. Study Design

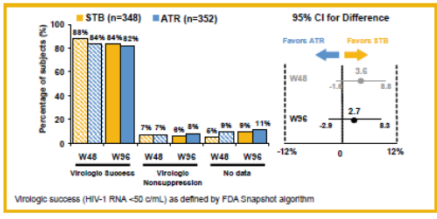
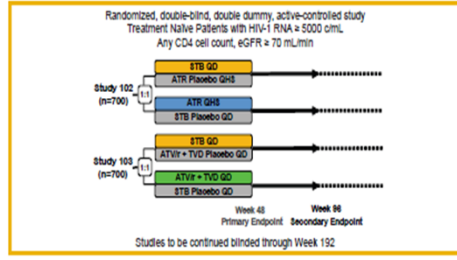
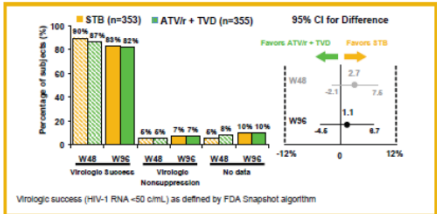


Figure 4. Efficacy Endpoint: HIV-1 RNA <50 c/mL



Zolopa A et al

QUAD 96 week data

Figure 6. Efficacy by Baseline HIV-1 RNA Subgroups

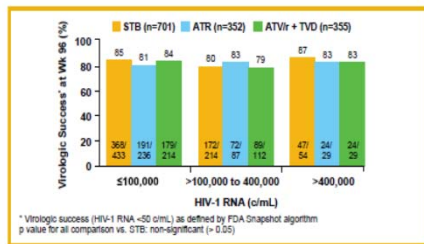


Figure 11. Common Neuropsychiatric AEs (All Grades)

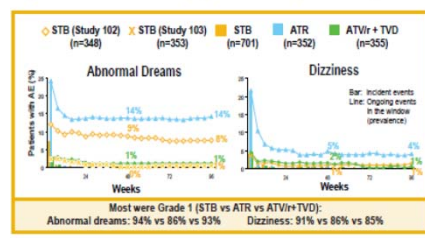


Table 2. Emergent Resistance Through Week 96

	STB (n=701)		ATR (n=352)		ATV/r + TVD (n=355)	
	W48	W96 (Δ)	W48	W96 (Δ)	W48	W96 (Δ)
Emergent Resistance, n	13 (1.9%)	+3 (+0.4%)	8 (2.3%)	+2 (+0.6%)	0	0
Primary INSTI-R or NNRTI-R or PI-R, n	11 (1.6%)	+3 (+0.4%)	8 (2.3%)	+2 (+0.6%)	0	0
	ER2Q: 8 N155H: 3 Q148R: 3 T60I: 2	+1 +2 0 0	K103N: 7 K101E: 0 V108I: 2 Y188F: 1 H4I: 0 M230L: 0 V00I: 1 G190A: 0 P225H: 0	+2 +3 0 +1 +2 +1 0 +1		
Primary NRTI-R, n	12 (1.7%)	+3 (+0.4%)	2 (0.6%)	+1 (+0.3%)	0	0
	M184V/I: 12 K65R: 4	+3 +1	M184V/I: 2 K65R: 2	+1 +1		



QUAD 96 week data

Figure 13. Change from Baseline in Fasting Lipids

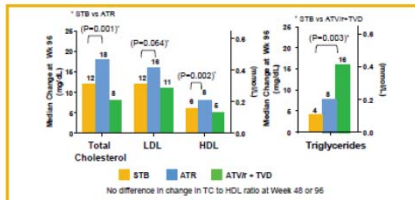


Figure 12. Changes in Serum Cr from Baseline and Week 4

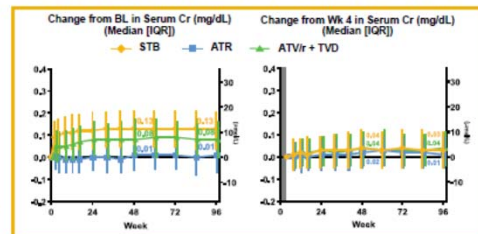
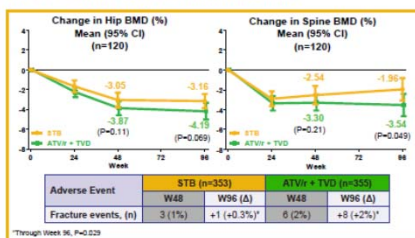


Figure 14. Changes in Bone Mineral Density



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Emergent Drug Resistance from the HIV-1 Phase 3 Elvitegravir/Cobicistat/Emtricitabine/Tenofovir Disoproxil Fumarate Studies through Week 96

K White*, ME Abram, R Kulkarni, M Rhee, J Szwarcberg, and MD Miller

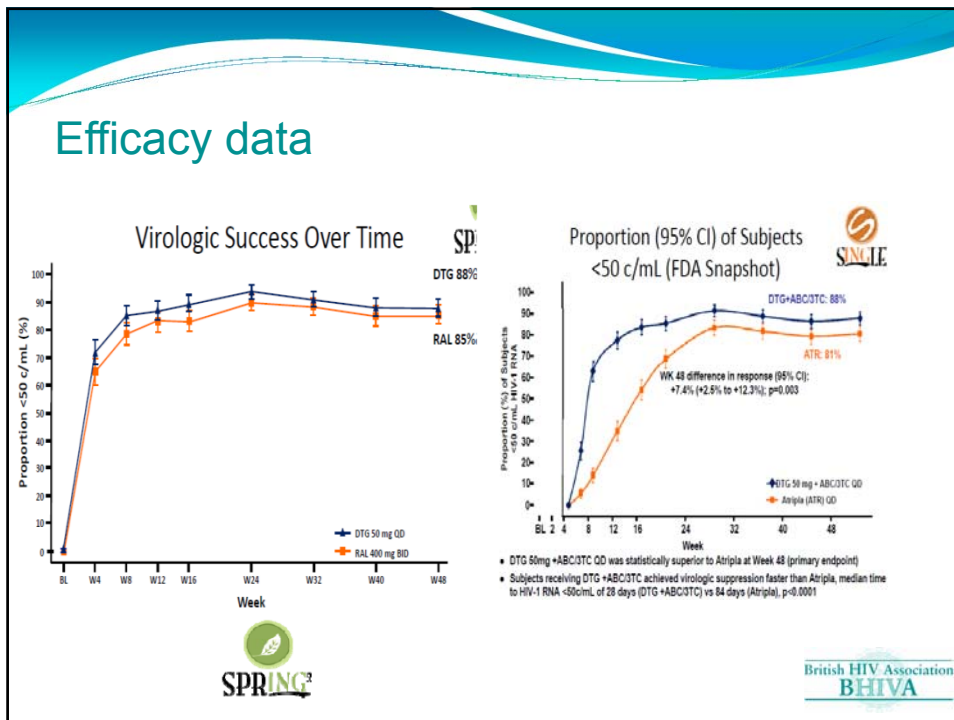
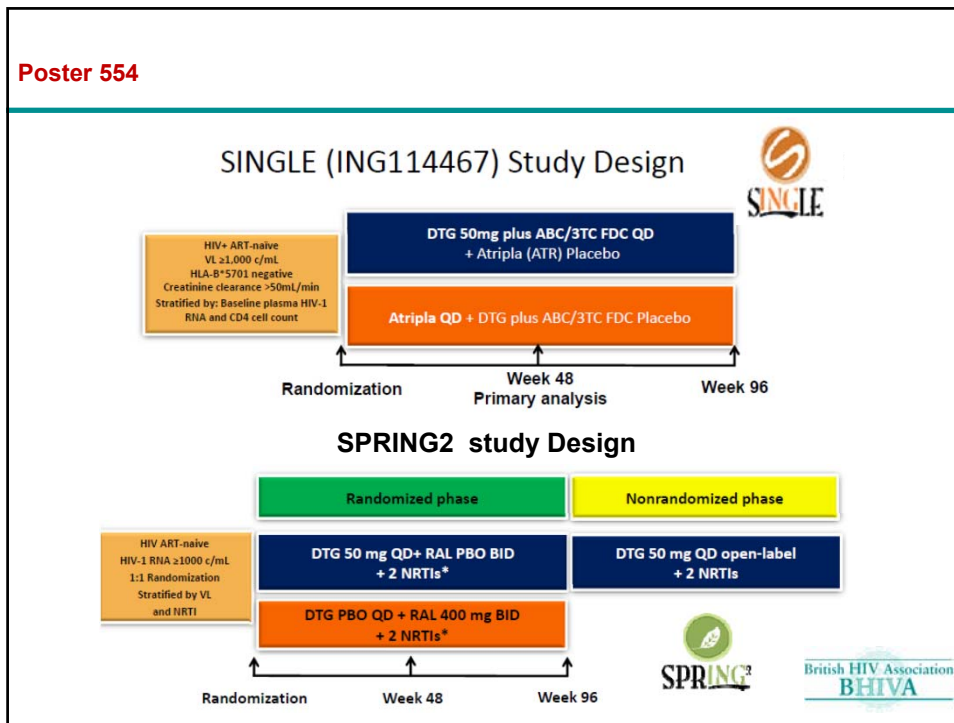
Gilead Sciences, Inc., Foster City, CA, US

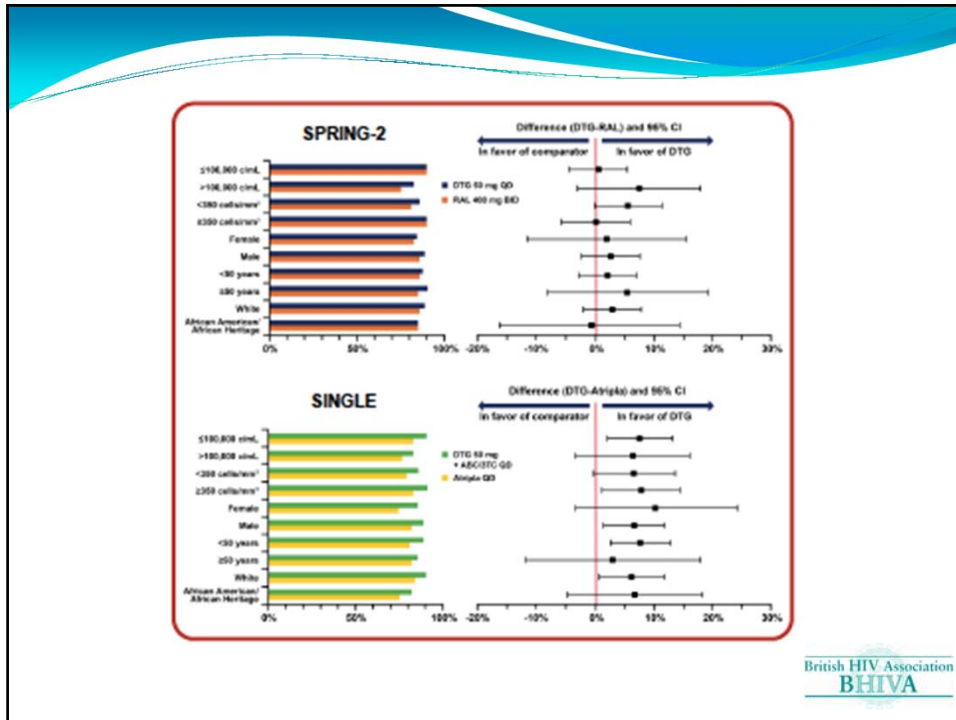
Table 6. Emergent Drug Resistance in Patients with Virologic Failure through Week 96 (Integrated Analysis of 0102 and 0103)

	STB (n = 701)	ATR (n = 352)	ATV/r + TVD (n = 355)
Resistance Analysis Population* % (n)	5.1% (36)	6.5% (23)	4.5% (16)
Developed Any Primary Resistance to Study Drugs% (n)	2.3% (16)	2.8% (10)	0% (0)
Baseline to Week 48	1.9% (13)	2.3% (8)	0% (0)
>Week 48 to Week 96	0.4% (3)	0.6% (2)	0% (0)
Emergent Primary Resistance Mutations % (n)	NRTI-R		
	FTC/TDF		
	FTC/TDF		
	FTC/TDF		
	M184V/I		
	K65R		
	M184V/I		
	K65R		
	3rd agent		
	EVG (INSTI)		
EFV (NNRTI)			
ATV/r (PI-R)			
E92Q			
N155H			
Q148R			
T66I			
K103N			
K101E			
V108I			
Y188F/H/L			
M230L			
V90I			
G190A			
P225H			
Primary PI-R	0% (0)	0.6% (2) †	0% (0)

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Poster 554

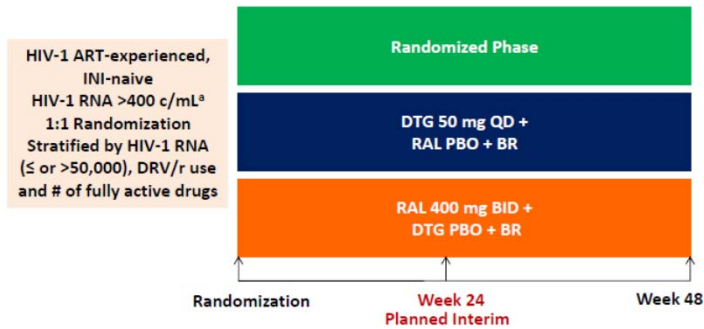




Treatment -Experienced studies

79LB Dolutegravir (DTG) Versus Raltegravir (RAL) in ART-Experienced, Integrase-Naive Subjects: 24-Week Interim Results From SAILING (ING111762)

Anton Pozniak,¹ Horacio Mingrone,² Andrey Shuldyakov,³ Carlos Brites,⁴ Jaime Federico Andrade-Villanueva,⁵ Debbie Hagins,⁶ Carlos Beltran Buendia,⁷ David Dorey,⁸ Sandy ⁹Chelsea and Westminster Hospital, London, UK; ¹⁰Ciudad Autónoma de Buenos Aires, Buenos Aires, Argentina; ¹¹Saratov Regional Center of Prophylactic AIDS, Saratov, Russian Federation; ¹²Salvador, Brazil; ¹³Hospital Civil de Guadalajara "Fray Antonio Alcalde," Guadalajara, Jalisco, Mexico; ¹⁴Chatham CARE Center, Savannah, GA, USA; ¹⁵Hospital Barros Luso Trudeau, Santiago; ¹⁶Research Triangle Park, NC, USA.



^a At Screening and a second consecutive test >400 c/mL within 4 months prior to Screening (if Screening HIV-1 RNA >1000 c/mL, no additional HIV-1 RNA assessment was needed)
PBO, placebo; BR, background regimen

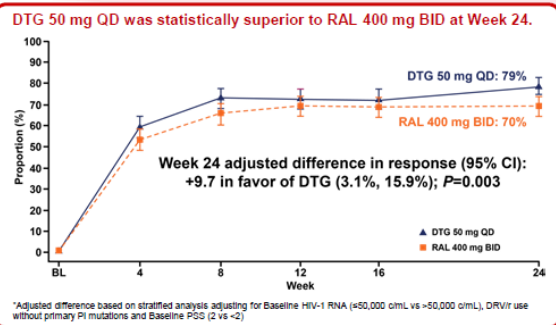


Pozniak et al. CROI 2013; Atlanta, GA. Poster #179LB.



Efficacy data

Figure 2. Proportion of Subjects With HIV-1 RNA <50 c/mL (Snapshot, mITT-E)



● Median CD4+ (interquartile range [IQR]) change from Baseline (observed case) was similar between arms: DTG: +99 cells/mm³ (n=325, IQR: 34, 184); RAL: +93 cells/mm³ (n=326, IQR: 46, 166).



Pozniak et al. CROI 2013; Atlanta, GA. Poster #179LB.



	DTG 50 mg QD (n=354)	RAL 400 mg BID (n=361)
HIV-1 RNA <50 c/mL	281 (79%)	252 (70%)
Virologic nonresponder ^a	53 (15%)	86 (24%)
No virologic data at Week 24 ^b	20 (6%)	23 (6%)
Per protocol, HIV-1 RNA <50 c/mL	263/323 (81%)	245/339 (72%)
95% Confidence interval	9.3 (3.0, 15.7)	
Response <50 c/mL by Baseline HIV-1 RNA	n/N (%)	n/N (%)
≤50,000 c/mL	207/249 (83%)	195/254 (77%)
>50,000 c/mL	74/105 (70%)	57/107 (53%)
Response <50 c/mL by Baseline CD4+		
<200 cells/mm ³	128/173 (74%)	115/184 (63%)
≥200 cells/mm ³	153/181 (85%)	137/177 (77%)
Response <50 c/mL by background regimen phenotypic susceptibility score^c		
<2	83/105 (79%)	67/94 (71%)
2	198/249 (80%)	185/267 (69%)
Use of DRV without primary PI mutations		
Yes	57/71 (80%)	63/78 (81%)
No	224/283 (79%)	189/283 (67%)

^a HIV-1 RNA not <50 c/mL in window; discontinued for lack of efficacy; discontinued for other reason while not <50 c/mL; change in ART
^b Discontinued due to AE, death or for other reasons unrelated to safety; missing data but still on study
^c PSS=0 (n=11); PSS=3 (n=2)

Pozniak et al. CROI 2013; Atlanta, GA. Poster #179LB

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ART for Treatment-experienced Patients

Omitting NRTI from ARV Regimens Is Not Inferior to Adding NRTI in Treatment-experienced HIV⁺ Subjects Failing a Protease Inhibitor Regimen: The ACTG OPTIONS Study (#153LB)

- NRTI are frequently included when constructing new ARV regimens for patients with virological failure (VF).
- OPTIONS study enrolled patients with NRTI, PI & NNRTI experience and virological failure (with or without resistance) in non-inferiority trial
- Patients randomised to new (optimised) regime (containing combination of INSTIs, PIs, MVC, ENF) with NRTIs or no NRTIs; primary endpoint virological failure up to 48 weeks
- 360 patients randomised. Baseline characteristics similar: median 3 active drugs (excluding NRTIs)
- At 48 weeks probability of failure 30% vs 26% (omitting vs adding NRTIs) – non-inferiority confirmed
- Primary safety endpoint not significantly different between both groups

Conclusions:

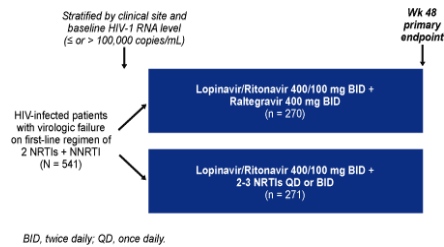
- In subjects with 3-class ARV experience and/or viral resistance, if more than 2 active ARV are used in a new regimen, NRTI can be safely omitted without compromising virological efficacy.
- Omitting NRTI may additionally reduce pill burden and cost.
- Guideline panels and clinicians should consider these results when recommending regimens for treatment-experienced patients.

ART for Treatment-experienced Patients

SECOND-LINE: Ritonavir-boosted Lopinavir with 2-3N(t)RTI or Raltegravir in HIV+ Subjects Virologically Failing 1st-line NNRTI/2N(t)RTI (#180LB)

- Optimal management following the virological failure (VF) of 1st-line NNRTI+2N(t)RTI regimen is not well defined
- SECOND-LINE trial investigated a switch to a nucleoside-sparing regimen using single agents from 2 new classes against the WHO standard (2 NRTIs + PI)

- Primary outcome: VL<200 at week 48
- 541 patients failing 1st line NNRTI-based ART randomised as shown:
- Modified ITT analysis: 81% vs 83% VL<200 in NRTIs vs RAL (p=0.59)
- No difference in outcomes according to VL strata (>100,000 vs <100,000)
- CD4 increase greater in RAL arm (167 vs 132 cells/mm³, p<0.01)
- Adverse events similar between arms



- **Conclusions**
- The virological efficacy of LPV/r with RAL was non-inferior to LPV/r with 2-3N(t)RTI, associated with better immunological reconstitution and was safe and well tolerated
- These results support the use of a LPV/r+RAL N(t)RTI-sparing regimen following failure of 1st line NNRTI+2N(t)RTI

Pharmacokinetic data

DOL Methadone and OCP PK/PD results

- Methadone Study – PK/PD Results
- Plasma exposures of total, R- and S-methadone were not affected by coadministration of 50 mg DTG BID.
- No statistically significant difference was noted between subjects receiving methadone only and subjects receiving DTG 50 mg BID + methadone for overall opiate agonist and withdrawal scores.
- Plasma exposures of EE and norelgestromin (NGMN) were not affected by coadministration of DTG 50 mg BID.
- DTG PK parameters were similar to historical values when dosed as 50 mg BID.
- Inspection of box plots demonstrated no apparent differences in LH, FSH or progesterone concentrations between OC coadministered with DTG and OC with placebo

Song et al. CROI 2013; Atlanta, GA. Poster #535

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178LB

Distribution and Antiviral Activity in Cerebrospinal Fluid (CSF) of the Integrase Inhibitor, Dolutegravir (DTG); ING116070 Week 16 Results

Scott Letendre,¹ Anthony Mills,² Karen Tashima,³ Deborah Thomas,⁴ Sherene Min,⁴ Shuguang Chen,⁴ Ivy Song,⁴ Stephen Piscitelli,⁴ on behalf of the extended ING116070 study team
¹UCSD Antiviral Research Center, San Diego, CA, USA; ²Anthony Mills MD, Inc, Los Angeles, CA, USA; ³The Miriam Hospital, Providence, RI, USA; ⁴GlaxoSmithKline, Research Triangle Park, NC, USA

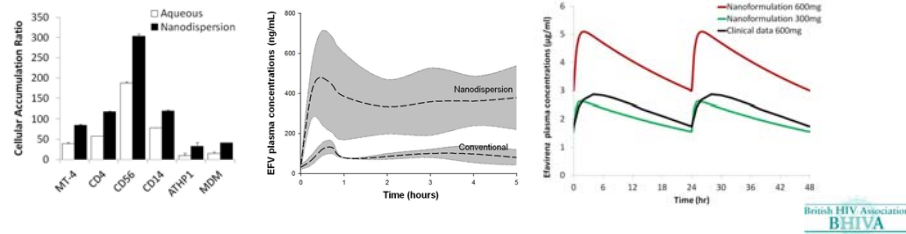
Conclusions

- DTG concentrations observed in CSF at both Week 2 and Week 16 exceed the in vitro IC_{50} against wild-type viruses (0.2 ng/mL)³ for all subjects, suggesting that DTG is able to achieve therapeutic concentrations in the CSF.
- DTG concentrations in CSF were similar to unbound DTG concentrations in plasma. Additionally, at Week 16, there were statistically significant correlations between DTG CSF and plasma (both total and unbound) concentrations. Levels were similar to those observed at Week 2.
- A regimen of DTG + ABC/3TC was effective in decreasing CSF HIV-1 RNA.
 - Median decreases in CSF HIV-1 RNA (-3.42 \log_{10} c/mL) at Week 16 were similar to those observed in plasma (-3.04 \log_{10} c/mL).
 - No direct correlation between DTG CSF concentrations and change from Baseline in CSF HIV-1 RNA levels was observed, likely due to combination therapy and the potent antiviral activity across subjects at Week 16 (decreases in CSF HIV-1 RNA from Baseline ranged from -1.46 to -5.60 \log_{10} c/mL).
- A regimen of DTG 50 mg QD with ABC/3TC demonstrated good short-term tolerability in this study.

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Nano-formulations Poster 512 a+b, 513

Name	Phase	NNRTI	PI	Integrase Inhibitor
GSK 744	1			✓
Folic Acid targeted nano-ART	Animal		✓	
EFV Solid drug Nanoparticles	Animal	✓		

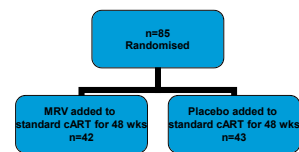


Maraviroc

Poster 555

• Maraviroc Intensification of cART in Patients with Suboptimal Immunological Recovery Does Not Increase CD4 Count

- 48-week, Placebo-controlled Trial
- At week 48, the increase in CD4 count was +15.2 (14.1-16.0) cells/ μ L in the placebo arm versus +22.8 (21.7-23.9) cells/ μ L in the MVC arm, which was not significantly different between the arms ($p = 0.50$).
- No immunological benefit of MVC intensification of cART in patients with suboptimal immunological recovery



Poster 567

• Maraviroc + Darunavir/ritonavir Once Daily Exhibits Rapid Early Viral Decay: Results of the Viral Dynamics Sub-study of MIDAS

- Initial (phase 1) HIV RNA decay rate during ART may predict subsequent virologic response
- Phase 1 decay was faster with MVC+DRV than LPV+2NRTI and comparable to EFV-containing regimens. Virologic response with MVC+DRV is likely similar to EFV-containing regimens.

555 S Lelyveld et al
567 B Taiwo et al

BHIVA 'Best of CROI' Working Party 2013

- **Dr A Apoola**, Royal Derby Hospital
- **Dr D Asboe**, Chelsea and Westminster Hospital, London
- **Dr S Bhagani**, Royal Free Hospital, London
- **Dr D Chadwick**, James Cook University Hospital, Middlesbrough
- **Dr D Churchill**, Royal Sussex County Hospital, Brighton
- **Dr P Collini**, University of Sheffield
- **Dr S Das**, Coventry and Warwickshire Hospital
- **Dr D Dockrell**, Royal Hallamshire Hospital, Sheffield
- **Dr T Doyle**, Royal Free Hospital, London
- **Dr MJ Fisher**, Royal Sussex County Hospital, Brighton
- **Dr A Freeman**, Cardiff University School of Medicine
- **Dr A Garcia-Diaz**, Royal Free Hospital, London
- **Dr M Gompels**, Southmead Hospital, Bristol
- **Dr J Greig**, Royal Hallamshire Hospital, Sheffield
- **Dr R Gupta**, University College London
- **Prof S Khoo**, University of Liverpool
- **Prof C Leen**, Western General Hospital, Edinburgh
- **Dr R O'Connell**, Royal London Hospital
- **Dr EC Ong**, Royal Victoria Infirmary, Newcastle
- **Dr C Orkin**, Bart's and The London NHS Trust
- **Dr A Palfreeman**, Leicester Royal Infirmary
- **Dr M Phillips**, Manchester Royal Infirmary
- **Dr K Rogstad**, Royal Hallamshire Hospital, Sheffield
- **Prof C Sabin**, Royal Free and University College London Medical School
- **Miss K Seden**, University of Liverpool
- **Dr J Thornhill**, Bart's and The London NHS Trust
- **Dr A Ustianowski**, North Manchester General Hospital
- **Miss R Weston**, Imperial College London