Clinical Pharmacology Related Considerations.

David Back

University of Liverpool
Disclosures

• Honoraria received for advisory boards and lectures from AbbVie, BMS, Gilead, Merck, ViiV, Janssen, Teva

• Educational grants for www.hep-druginteractions.org and www.hiv-druginteractions.org from AbbVie, BMS, Gilead, Janssen, Merck, ViiV
Overview

1. The changing face of treatment.
Overview of Clinical Guidelines and First-Line Antiretroviral Treatment Options

- **EACS**¹: PIs or INSTIs or NNRTIs + NRTI backbone
- **US DHHS**²: PIs or INSTIs + NRTI backbone
- **IAS-USA**³: INSTIs + NRTI backbone
- **WHO**⁴: NNRTIs + NRTI backbone

Options:
- DRV/r
- DRV/c
- RAL
- DTG
- EVG/c
- RPV
- EFV
- TDF/FTC
- TAF/FTC
- ABC/3TC

Arribas J PeerCME June 2017
Overview of Clinical Guidelines and First-Line Antiretroviral Treatment Options

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Preferred Regimens Based on</th>
</tr>
</thead>
<tbody>
<tr>
<td>EACS¹</td>
<td>PIs or INSTIs or NNRTIs + NRTI backbone</td>
</tr>
<tr>
<td>US DHHS²</td>
<td>PIs or INSTIs + NRTI backbone</td>
</tr>
<tr>
<td>IAS-USA³</td>
<td>INSTIs + NRTI backbone</td>
</tr>
<tr>
<td>WHO⁴</td>
<td>NNRTIs + NRTI backbone</td>
</tr>
</tbody>
</table>

- DRV/r
- DRV/c
- RAL
- DTG
- EVG/c
- RPV
- EFV
- TDF/FTC
- TAF/FTC
- ABC/3TC
Merck Receives FDA Approval of ISENTRESS® HD (raltegravir), a New Once-Daily Option, in Combination with Other Antiretroviral Agents, for the Treatment of HIV-1 Infection in Appropriate Patients

5/30/17 7:00 am EDT

Raltegravir (RAL) 1200 mg once daily (QD) versus RAL 400 mg twice daily (BID), in combination with tenofovir disoproxil fumarate/emtricitabine (TDF/FTC), in previously untreated HIV-1 infection through week 96

P. Cahn for the ONCEMRK Study Group

IAS 2017: TULBPEB20

Single- and Multiple-Dose Pharmacokinetics of Once-Daily Formulations of Raltegravir

Rajesh Krishna¹, Matthew L. Rizk¹, Patrick Larson¹, Valerie Schulz¹, Filippos Kesisoglou¹, and Radu Pop²
First-Line ART Regimens for Adults
WHO Guidelines June 2016

<table>
<thead>
<tr>
<th>First-line ART</th>
<th>Preferred first-line regimens</th>
<th>Alternative first-line regimens&lt;sup&gt;a,b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>TDF + 3TC (or FTC) + EFV</td>
<td>AZT + 3TC + EFV (or NVP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TDF + 3TC (or FTC) + DTG&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TDF + 3TC (or FTC) + EFV&lt;sup&gt;400&lt;/sup&gt;&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TDF + 3TC (or FTC) + NVP</td>
</tr>
</tbody>
</table>

<sup>C</sup> EFV at lower dose of 400 mg
<sup>e</sup> Safety and efficacy data on the use of EFV400 in pregnant women, people with HIV/TB coinfection and adolescents younger than 12 years of age are not yet available.

**Antiretroviral dose optimization: the future of efavirenz 400 mg dosing**

Marta Boffito<sup>a,b</sup>, Mohammed Lamorde<sup>e</sup>, Melynda Watkins<sup>a</sup>, and Anton Pozniak<sup>c</sup>

Curr Opin HIV AIDS 2017; 12: 339-342

Pharmacokinetics, pharmacodynamics and pharmacogenomics of efavirenz 400mg once-daily during pregnancy and postpartum
Marta Boffito, Chelsea and Westminster Hospital, United Kingdom.
IAS 2017: TUPDB0203LB
# Newer ART Agents (partial list)

<table>
<thead>
<tr>
<th>Phase</th>
<th>NRTI</th>
<th>NNRTI</th>
<th>PI</th>
<th>EI</th>
<th>II</th>
<th>MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 3</td>
<td></td>
<td>Doravirine</td>
<td></td>
<td>Albuviridine Fostemsavir Ibalizumab</td>
<td>Bictegravir Cabotegravir</td>
<td></td>
</tr>
<tr>
<td>Phase 2</td>
<td>Apricitabine Festinavir Dexelvucitabine</td>
<td>BILR 355 Elsulfavirine</td>
<td></td>
<td>Cenicriviroc PF-232798</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 1/2</td>
<td></td>
<td></td>
<td>TMC 310911</td>
<td>HGS004 UB-421</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase I</td>
<td>MK-8591</td>
<td>RDEA 806</td>
<td>CTP-298 CTP-518 PPL-100 SPI-256</td>
<td>BMS-986197 SCH532706 VIR-576</td>
<td>BI 224436 GSK-2838232</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Gulick R, HIV Therapy, Glasgow 2016
Bictegravir Disposition and PK

- BIC/FTC/TAF 50/200/25 mg STR under evaluation in Phase 3 studies
- Well absorbed (>70%)
- Metabolized by CYP3A4 and UGT1A1
- Inhibition of both CYP3A4 & UGT1A1 needed for marked increase in exposure
- Minimal renal clearance (~1% of parent drug excreted in urine)
- Potent induction reduces exposure to a clinically significant extent.
## Bictegravir: DDIs via CYP3A4, UGT1A1 and P-gp

<table>
<thead>
<tr>
<th>BIC Co-administered Drug(s) and Dose(s)</th>
<th>Dose(s) of BIC</th>
<th>Geometric Mean Ratio % (90% CI) of BIC PK With/Without Co-administered Drugs (n=15 for each cohort)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$C_{max}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$AUC$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$C_{tau}$</td>
</tr>
<tr>
<td>ATP (400 mg) QD</td>
<td>BIC (75 mg) SD Fed</td>
<td>128 (123, 134)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>415 (381, 451)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>ATP (300 mg) + COBI (150 mg) QD</td>
<td>BIC (75 mg) SD Fed</td>
<td>131 (123, 140)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>406 (376, 438)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Voriconazole (300 mg) BID</td>
<td>BIC (75 mg) SD Fasted</td>
<td>109 (96.1, 123)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>161 (141, 184)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>DRV/COBI (800/150 mg) QD</td>
<td>BIC (75 mg) MD Fed</td>
<td>152 (140, 164)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>174 (162, 187)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21 (195, 229)</td>
</tr>
<tr>
<td>Rifabutin (300 mg) QD</td>
<td>BIC (75 mg) MD Fasted</td>
<td>80.4 (66.9, 96.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>62.0 (53.1, 72.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44.0 (37.1, 52.1)</td>
</tr>
<tr>
<td>Rifampin (600 mg) QD</td>
<td>BIC (75 mg) SD Fed</td>
<td>72.2 (67.1, 77.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24.5 (22.0, 27.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
</tr>
</tbody>
</table>
Cabotegravir Disposition and PK

- CAB under evaluation in Phase 3 studies as:
  - Oral 30 mg tablet ($t_{1/2}$, ~40 hours)
  - LA nanosuspension 200 mg/mL ($t_{1/2}$, ~20-40 days)

- CAB is primarily metabolised by UGT1A1 (minor involvement of UGT1A9)

- CAB is a substrate of P-gp and BCRP

- Potent induction (by rifampicin) reduces exposure by a clinically significant extent (~60%)

- CAB inhibits sensitive OAT substrates (eg methotrexate) BUT overall low risk of DDIs as perpetrator.

Overview

1. The changing face of treatment.

2. 2 Drug Regimens (2DR)

3. [Blank]
Why consider 2DR?

- Why take 3 (or 4) drugs, when 2 can do?
- Potential preservation of future treatment options
- Reduce impact of long-term exposure to multiple ARVs
- Less potential for AEs?
- Fewer drugs - Potential to reduce DDIs
- Important with Aging patients and Comorbidities
- Cost?
- Establish new treatment paradigms and evolve the SoC.

AE, adverse event; ARV, antiretroviral; DDI, drug-drug interaction; HCP, healthcare professional; SoC, standard of care; 2DR, two-drug regimen;
What would make an ideal 2DR?

- Potent antiviral activity
- Low cost; Affordable
- Favourable PK/DDI profile
- Reduced cumulative long-term drug exposure
- High barrier to resistance
- Fewer short-term and long-term AEs/toxicities

AE, adverse event; DDI, drug–drug interaction; PK, pharmacokinetic

Slide modified from Viiv Healthcare
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- TAF/FTC
- ABC/3TC

Arribas J PeerCME June 2017
Why consider DTG as a core agent to support 2DRs?

**Clinical trial data**
- Numeous trials in tx-naïve and tx-experienced subjects.

**Generally well tolerated**
- Few discontinuations due to AEs in INI-naïve clinical trials.

**Rapid and potent antiviral activity**

**High barrier to resistance**
- *In vitro* and Phase III data

**Long binding to WT INI**
- Dissociation from INI–DNA complexes slower vs RAL or EVG

**Long half-life; low variability in exposure**
- DTG exposure 17-fold above IC₉₀
- Long ‘tail’

**DDIs**
- Booster-free
- Relatively few clinically significant DDIs

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ATV; atazanavir; DDI, drug–drug interaction; DRV, darunavir; EFV, efavirenz; EVG, elvitegravir; INI, integrase inhibitor; RAL, raltegravir; tx, treatment; QD, once daily; WT, wild-type

Why 3TC or RPV in combination with DTG?

- Present in all major Guidelines\(^{1-4}\)
- Well tolerated; Low number of discontinuations due to AEs in pivotal clinical trials\(^{5-8}\)
- Long Intracellular half-life (22h)\(^9\)
- Low potential for DDIs\(^9\)
- Clinical data emerging\(^{10}\)

**3TC**

- LATTE & LATTE-2 proof of principle for INH-RPV 2-DR for maintenance therapy\(^{11,12}\).
- Long half-life (~50h) and relatively low DDI profile\(^9\)
- Tolerability\(^{13}\). RPV associated with fewer neurological and psychiatric AEs than EFV in tx-naïve patients

**RPV**

Why Cabotegravir in combination with RPV?

- CAB Oral 30 mg ($t_{1/2}$, ~40 hours)
- CAB LA nanosuspension 200 mg/mL ($t_{1/2}$, ~20-40 days)
- RPV Oral 25 mg ($t_{1/2}$, ~50 hours)
- RPV LA nanosuspension 300 mg/mL ($t_{1/2}$, ~30-90 days)

- Oral 2-drug CAB + RPV proof of efficacy through Week 96 in LATTE-1
- im 2-drug CAB + RPV maintained VL < 50 in LATTE-2*

*Safety and efficacy of long-acting CAB and RPV as two drug IM maintenance therapy: LATTE-2 week 96 results
J. Eron¹, D. Margolis², J. Gonzalez-Garcia³, H.-J. Stellbrink⁴, Y. Yazdanpanah⁵, D. Podzamczer⁶, T. Lutz⁷, J.B. Angel⁸, G.J. Richmond⁹, B. Clotet¹⁰, F. Gutierrez¹¹, L. Sloan¹², K.C. Sutton², D. Dorey¹³, K.Y. Smith², P.E. Williams¹⁴, W.R. Spreen²
IAS 2017: MOAX0205LB

CAB, cabotegravir; LA, long-acting; RPV, rilpivirine; $t_{1/2}$, half-life.

## Half Lives of 2-Drug Regimens

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Half Lives (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolutegravir (DTG) + 3TC</td>
<td>DTG 3TC (plasma) 3TC-TP (cell)</td>
</tr>
<tr>
<td></td>
<td>~14h¹ ~5h¹ ~22h¹</td>
</tr>
<tr>
<td>Dolutegravir (DTG) + Rilpivirine (RPV)</td>
<td>DTG RPV</td>
</tr>
<tr>
<td></td>
<td>~14h¹ ~50h¹</td>
</tr>
<tr>
<td>Cabotegravir (CAB) + Rilpivirine (RPV)</td>
<td>CAB (oral) RPV (oral CAB(im) RPV (im)</td>
</tr>
<tr>
<td></td>
<td>~40h² ~50h¹ ~20-40days² ~30-90 days²</td>
</tr>
</tbody>
</table>

Note: Bictegravir half life is ~17h³

Dolutegravir and Elvitegravir Plasma Concentrations after stopping drug.

# PK-PD Characteristics of Integrase Inhibitors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DTG</th>
<th>EVG</th>
<th>RAL</th>
<th>CAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC$_{50PA}$ ng/ml</td>
<td>16</td>
<td>7.2</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>IC$_{90PA}$ ng/ml</td>
<td>64</td>
<td>NA</td>
<td>NA</td>
<td>164</td>
</tr>
<tr>
<td>IC$_{95PA}$ ng/ml</td>
<td>NA</td>
<td>44.9</td>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>EC$_{50}$ ng/ml</td>
<td>36</td>
<td>14</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>EC$_{90}$ ng/ml</td>
<td>324</td>
<td>126</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>C$_{trough}$ (ng/ml)</td>
<td>1090</td>
<td>450</td>
<td>120</td>
<td>4100 (30 mg)</td>
</tr>
<tr>
<td>IQ (C$<em>{trough}$/IC$</em>{90/95PA}$)</td>
<td>17</td>
<td>10</td>
<td>8</td>
<td>25</td>
</tr>
</tbody>
</table>

IC$_{50/90/95PA}$ protein binding adjusted conc inhibiting viral replication by 50/90/95%
Genetic Barrier to Resistance for Specific ARVs

Fully Suppressive Therapy

• Where fully suppressive concentrations of antiretroviral drug(s) are uniformly achieved at all sites of viral replication.

Determinants of Drug Penetration into sites of viral infection

• Lipophilicity
• Molecular Weight
• Plasma Protein Binding
• Transporters
## Dolutegravir and Darunavir in CSF, Male and Female Genital Tract

<table>
<thead>
<tr>
<th>Matrix</th>
<th>DTG ng/ml</th>
<th>DTG Ratio to BP</th>
<th>DRV ng/ml</th>
<th>DRV Ratio to BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF</td>
<td>18</td>
<td>0.02</td>
<td>16</td>
<td>0.01</td>
</tr>
<tr>
<td>Semen</td>
<td>58</td>
<td>0.07</td>
<td>390</td>
<td>0.17</td>
</tr>
<tr>
<td>CVF</td>
<td>93*</td>
<td>0.06-0.10</td>
<td>170</td>
<td>0.09</td>
</tr>
</tbody>
</table>

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Tivicay SmPC; Adams Jl et al AVT 2013; 18: 1005-1014; Greener BN et al. JAIDS 2013; 64:39-44; Calcagno A et al CID 2015; 60: 311-317; Else LJ et al AVT 2011; 16; 1149-1167
# Yearly intake of ARV by regimen

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Daily Dose (mg)</th>
<th>Yearly dose (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3-Drug Regimens:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRV/r + FTC/TDF</td>
<td>800/100 + 200/300</td>
<td>511.0</td>
</tr>
<tr>
<td>RAL + F/TAF</td>
<td>800 + 200/10</td>
<td>368.7</td>
</tr>
<tr>
<td>DTG/ABC/3TC</td>
<td>50/600/300</td>
<td>346.8</td>
</tr>
<tr>
<td>EVG/c/FTC/TAF</td>
<td>150/150/200/10</td>
<td>186.2</td>
</tr>
<tr>
<td><strong>2-Drug Regimens:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DTG + 3TC</td>
<td>50 + 300</td>
<td>127.8</td>
</tr>
<tr>
<td>DTG + RPV</td>
<td>50 + 25</td>
<td>27.4</td>
</tr>
<tr>
<td>CAB&lt;sub&gt;oral&lt;/sub&gt; + RPV&lt;sub&gt;oral&lt;/sub&gt;</td>
<td>30 + 25</td>
<td>20.1</td>
</tr>
</tbody>
</table>

**Note:** CAB<sub>im</sub> + RPV<sub>im</sub> 400 + 600 every 8 weeks = 6 g

50 years of tx
Overview

1. The changing face of treatment.
2. 2 Drug Regimens (2DR)
3. Long Acting ARVs
Long-Acting Antiretrovirals: Where Are We now?

Amesika N Nyaku¹ · Sean G Kelly² · Babafemi O Taiwo³,⁴

- Long-acting antiretroviral drugs promise new options for HIV prevention and treatment, and can address poor adherence and treatment fatigue.

- Ongoing studies will identify LA agents/combinations suitable for routine use.

- Creative solutions will be needed for anticipated implementation challenges.
LATTE-2 Week 48 Results: HIV-1 RNA <50 c/mL by Snapshot (ITT-ME)

Induction period

Maintenance period

<table>
<thead>
<tr>
<th>Study visit</th>
<th>Induction period</th>
<th>Maintenance period</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W-12</td>
<td></td>
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</tr>
<tr>
<td>W-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td></td>
<td></td>
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<tr>
<td>W4</td>
<td></td>
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<td>W8</td>
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<td>W20</td>
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<td>W24</td>
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<td>W28</td>
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<tr>
<td>W32</td>
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</tr>
<tr>
<td>BL</td>
<td>W16</td>
<td>W-12</td>
</tr>
<tr>
<td>W-16</td>
<td>W-12</td>
<td>W-8</td>
</tr>
<tr>
<td>W-8</td>
<td>W-4</td>
<td>D1</td>
</tr>
<tr>
<td>W-4</td>
<td>D1</td>
<td>W4</td>
</tr>
<tr>
<td>D1</td>
<td>W4</td>
<td>W8</td>
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<td>W4</td>
<td>W8</td>
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<td>W20</td>
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<td>W24</td>
<td>W28</td>
<td>W32</td>
</tr>
<tr>
<td>W28</td>
<td>W32</td>
<td>BL</td>
</tr>
</tbody>
</table>

Oral CAB induction (CAB + ABC/3TC) Wk -4 add RPV oral

Oral CAB + ABC/3TC (n=56)

CAB 400 + RPV 600 Q4W IM (n=115)

CAB 600 + RPV 900 Q8W IM (n=115)

Proportion of patients with virological suppression, %

<table>
<thead>
<tr>
<th>Snapshot success</th>
<th>D1</th>
<th>W32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4W</td>
<td>99%</td>
<td>94%</td>
</tr>
<tr>
<td>Q8W</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>Oral</td>
<td>98%</td>
<td>91%</td>
</tr>
</tbody>
</table>

Margolis et al. AIDS 2016; Durban, South Africa. Abstract THAB0206LB.
CAB & RPV Pharmacokinetics

- Both Q4W and Q8W steady state exposures approximate once-daily oral dosing

Ct, trough concentration; PA-IC90, protein binding–adjusted 90% inhibitory concentration; SD, standard deviation.

Margolis et al. AIDS 2016; Durban, South Africa. Abstract THAB0206LB.
LATTE-2 Subject 551—W48 PDVF vs. Q8W Dosing—Plasma Concentrations

PDVF: $<1.0 \log_{10} \text{c/mL}$ decrease in plasma HIV-1 RNA by Week 4, OR confirmed HIV-1 RNA $\geq200 \text{c/mL}$ after prior suppression to $<200 \text{c/mL}$, OR $>0.5 \log_{10} \text{c/mL}$ increase from nadir HIV-1 RNA value $\geq200 \text{c/mL}$

Cr, trough concentration; PA-IC90, protein binding–adjusted 90% inhibitory concentration; Q8W, every 8 weeks; SD, standard deviation.

Margolis et al. AIDS 2016; Durban, South Africa. Abstract THAB0206LB.
Selection of Rilpivirine-Resistant HIV-1 in a Seroconverter From the SSAT 040 Trial Who Received the 300-mg Dose of Long-Acting Rilpivirine (TMC278LA)

Penrose K et al. JID 2016; 213: 1013-1017
Residual Plasma RPV Concentration after im Dosing: PK Tail

- RPV was found in plasma and genital tract fluids > 18 months after SD of LA RPV
- Characterizing the extended PK profile is critical to inform management of the PK tail to avoid the potential for antiretroviral resistance

McGowan I et al; HVR4P October 2016
An Open Label Multiple Dose Phase 1 Assessment of Long Acting Rilpivirine

Ian McGowan MD PhD FRCP
on behalf of the MWRI-01 Study Team

IAS 2017: TUAC0103
Long Acting: Some Key Issues

- What drugs can be combined?
- Injection volume?
- What to do about missed doses
- Long term low drug levels at end of dosing interval
- Management of adverse events – non-reversible
  - Need for oral lead-in
- How much long term safety and efficacy data required?
- DDIs different?
MK-8591 (EFdA): A Novel Nucleoside with a Unique Mechanism of Action

- Inhibits RT by preventing translocation
- Non obligate chain terminator
- IC EFdA-TP half life = 103h
- 10 mg oral SD in HIV+ pts gives 1.6log drop in VL at day 7-10 ( > than SD TAF).

Single doses as low as 0.5 mg of the novel NRTTI MK-8591 suppress HIV for at least 7 days
R P Matthews

IAS 2017: TUPDB0202LB

Grobler J et al CROI 2016
MK-8591 Parenteral Formulations Release Effective Drug Levels for >180 days

- > 180 day extended release from solid formulations after single injection in rat.
- Extended release from implant in NHP

Grobler J et al CROI 2016
Tenofovir Alafenamide (TAF) Implants

Fig. 5  TAF Thin Film Polycaprolactone Device Prototypes. (A) 2.5 mm diameter, 40 mm long prototypes loaded with 230 mg 1:1 TAF:PEG300 (w/w). (B) 0.6 mm diameter, 20 mm long prototype loaded with 26 mg 1:1 TAF:PEG300 (w/w).

Schlesinger E et al Pharm Res 2016; 33: 1649-1656

Gunawardana M et al; AAC; 2015; 59: 3913-3919
Transforming HIV treatment with nanoformulations

OPTIMIZE – a global partnership to accelerate access to simpler, safer and more affordable HIV treatment – is investing in bringing nanoformulated antiretroviral therapy from the laboratory to the market to improve HIV treatment for patients and programs.

Current reality

The UNAIDS 90-90-90 targets and WHO’s “Treat all” guidelines demand a rapid expansion of access to ART. In 2015, around 46% of all people living with HIV had access to treatment.

Harnessing the power of science, technology, innovation and partnerships can help close the gap between those who are living with HIV, and those who need treatment.

Powered by OPTIMIZE, a global partnership unifying distinct voices to achieve a common goal: accelerating access to simpler, safer and more affordable HIV treatment.

For further information or to request technical assistance from OPTIMIZE, please contact Joanne (Jo) Sharp, UoL Program Manager, at momeej2@liverpool.ac.uk or +44 151-794 5553.

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