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HIV Drug Resistance

Together, we can change the course of the HIV epidemic…one woman at a time.

#onewomanatatime #thewellproject

What Is Resistance?

HIV drugs are designed to control your viral load under control by ***preventing the virus from reproducing***

- Sometimes HIV changes (**mutates**) as it makes copies of itself
  - Changes allow virus to overcome effects of a drug and keep reproducing
  - When this happens, HIV has developed **resistance** to that drug
- Resistance is a major challenge in HIV treatment:
  - Decreases ability of HIV drugs to control the virus
  - Reduces treatment options

What Is Resistance?

- The best way to ***prevent resistance*** is to stick closely (**adhere**) to HIV drug regimen
- With good adherence, resistance is less likely to develop
- Keeps more treatment options open for the future

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What Causes Resistance?

- After infecting a CD4 cell (disease-fighting white blood cell), HIV makes many new copies of itself that then infect other CD4 cells
  - This happens very quickly; HIV can make billions of new viruses every day
- When making new viruses, HIV must copy its genetic information
- Copying happens so fast that mistakes (**mutations**) can happen
  - Some mutations are harmless
  - Other mutations can cause big problems and allow a virus to reproduce even when it is exposed to certain HIV drugs

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What Causes Resistance?

- If a drug does not work against a mutated virus, that virus will reproduce rapidly
  - This causes viral load to go up
  - May have to change drugs to get HIV back under control
- Main reason to use a combination of HIV drugs is to block reproduction at several points in HIV's lifecycle
  - Combination of drugs aimed at several different targets is much better at preventing HIV reproduction than one alone
- With less reproduction:
  - Viral load is lower
  - Mutations and resistance are less likely to occur

Cross-Resistance and Sequencing

Cross-resistance: When mutations cause resistance not just to one drug, but to an ***entire class of drugs***

- There are six classes of HIV drugs:
  - Nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs)
  - Non-nucleoside reverse transcriptase inhibitors (NNRTIs)
  - Protease Inhibitors (PIs)
  - Entry inhibitors
  - Integrase inhibitors
  - Boosting agents

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Cross-Resistance and Sequencing

- Cross-resistance is ***more likely to happen in some classes*** than others
  - NRTIs
  - NNRTIs
  - May limit choices when picking new combination of HIV drugs
- Health care providers think about future HIV regimen options in case current regimen does not work
  - This is called **sequencing** treatment

How Is Drug Resistance Detected?

- Resistance is common, can be transmitted with the virus
  - 10-17% of newly infected people acquire strains of virus that are resistant to at least one HIV medication
  - Have less selection of HIV treatments to choose from
- People living with HIV who have taken HIV drugs are more likely to have resistant virus, fewer drug choices
- Regular viral load tests are best way to tell if you have drug resistance
  - If HIV drugs are working well, your viral load should be "undetectable"
- Have a drug resistance test if you are taking HIV drugs and:
  - Your viral load does not become undetectable
  - Your viral load goes up after you have been taking the drugs for a while

Resistance Testing

- US Department of Health and Human Services guidelines recommend drug resistance testing for people who:
  - Just acquired HIV
  - Are starting HIV care
  - Have never been on HIV drugs and are planning to start
  - Are on HIV drugs and see their viral load go up (usually over 1,000 copies/mL)
  - Have started HIV drugs but viral load is not coming down enough
  - Are pregnant and living with HIV
- Resistance testing is ***not usually recommended*** for:
  - People who have stopped HIV drugs for four weeks or more
  - People with a viral load below 500 copies

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Ways to Test for Resistance

Genotype test:

- Uses HIV from your blood to check for mutations associated with drug resistance
- Preferred test for those:
  - Who are new to HIV treatment
  - Whose HIV drugs fail to bring their viral load down enough
  - Who are pregnant with detectable virus while on treatment

Phenotype test:

- Exposes your virus to many HIV drugs in a test tube
  - Determines which drugs still work against your HIV
  - Preferred test for people with complex drug-resistance patterns

Ways to Test for Resistance

Virtual phenotype test:

- Genotype test that goes one step further
  - Takes your genotype
  - Finds similar genotypes in a database
  - Uses their phenotypic test results to predict which drugs will be effective against your virus (and its mutations)

Resistance tests are helpful when choosing a drug regimen, ***but***

- Tests are only a guide
- Other factors (past medications, side effects, adherence) should be taken into account

Preventing Resistance

The best way to avoid resistance is to ***take medications daily as prescribed***

- Important not to skip doses
- Take medications at the same time every day
- Good adherence
- Remember, **good adherence** is the best way to prevent resistance
  - Follow your medication schedule
  - The virus will not reproduce as quickly
  - If not reproducing, ***cannot make changes that lead to resistance***

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Learn More!

- To learn more, please read the full fact sheet on this topic:
  - Resistance
- For more fact sheets and to connect to our community of women living with HIV, visit:
  - www.thewellproject.org
  - www.facebook.com/thewellproject
  - www.twitter.com/thewellproject