Space Race, Siri and the Central Dogma: A Contemporary Nursing Analysis of Antibiotics Resistance

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Space Race, Siri and the Central Dogma:

A Contemporary Nursing Analysis of Antibiotics Resistance

NU499

Donovan Lucibello

Central dogma of molecular biology
It’s bad . . .
The spider in the house decision tree:

Coexist? [Decision Point]

Yes

No

Central dogma of molecular biology:

DNA → Transcription → RNA → Translation → Proteins

Photo Credit: https://www.space.com/38720-nasa-rocket-v-rocket-surprising-facts.html

Photo Credit: http://hyperphysics.phy-astr.gsu.edu/hbase/Organic/dogma.html

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The spider in the house decision tree:

Yes → Coexist?

No → Kill it?

No → No

Central dogma of molecular biology:

DNA → Transcription → RNA → Translation → Protein
The spider in the house decision tree:

Yes → Coexist?

Coexist?

Yes → Method

Method

Yes → Shoe

No → Other

Other

No → Kill it?

Kill it?

Yes → Method

Method

Yes → Shoe

No → Other

Other

No → Kill it?

Kill it?

Yes → Method

Method

Yes → Shoe

No → Other

Other

No → Kill it?

Kill it?

Yes → Method

Method

Yes → Shoe

No → Other

Other

No → Kill it?

Kill it?

Yes → Method

Method

Yes → Shoe

No → Other

Other

No → Kill it?

Kill it?

Yes → Method

Method

Yes → Shoe

No → Other

Other

No → Kill it?

Kill it?
Some solutions have room for improvement
Similar exercise, except the stakes are higher . . .
Similar exercise, except the stakes are higher...
Similar exercise, except the stakes are higher . . .

Sensitivity? Virulence factors? Species?

Central dogma of molecular biology
Positive correlation aka . . . the “dose – response”
Present diagnosis methods:

- **Clinical Onset**
  - **Empirical Data**
  - **Method**
  - **Culture**
    - **Method**
    - **Molecular**

- **Reliable, inexpensive, however slow**
- **Rapid but expensive**

Central dogma of molecular biology:

- DNA
- Transcription
- RNA
- Translation
- Proteins

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Photo Credit: https://www.ephotozine.com/article/iphone-xs--xs--max--vs--iphone-x--what--s--new--what--s--better---what--s--the--same--32713
Empirical data:

Central dogma of molecular biology:

- DNA
- Transcription
- RNA
- Translation
- Proteins

Empirical data:
What do nurses believe is/are the cause(s) of antibiotic resistance?
What do nurses believe is/are the cause(s) of antibiotic resistance?

13 options: 10 inclusive (select all that apply) & 3 exclusive
Of the 10 inclusive, only 6 were causes supported in the literature and implicated DNA
What do nurses believe is/are the cause(s) of antibiotic resistance?

13 options: 10 inclusive (select all that apply) & 3 exclusive

Of the 10 inclusive, only 6 were causes supported in the literature and implicated DNA.

Could a nurse select the causes for antibiotic resistance?
What do nurses believe is/are the cause(s) of antibiotic resistance?

- $H_0 = 3 / 6$
- no penalty for guessing
What do nurses believe is/are the cause(s) of antibiotic resistance?

- $H_0 = 3 / 6$
- no penalty for guessing

On paper

On paper

Via SurveyMonkey.com
What do nurses believe is/are the cause(s) of antibiotic resistance?

- \( H_0 = \frac{3}{6} \)
- no penalty for guessing

Student Nurses: n = 122
- mean = 3.795
- sd = 1.157
- CI = 3.588, 4.002
- p-value = \(7.3 \times 10^{-12}\)

Professional Nurses: n = 625
- mean = 3.054
- sd = 1.431
- CI = 2.942, 3.167
- p-value = 0.342
If empirical data is preferred, how do we get it?

Central dogma of molecular biology

DNA → Transcription → RNA → Translation → Proteins
If empirical data is preferred, how do we get it?
If empirical data is preferred, how do we get it?
## Compare MinION packages

<table>
<thead>
<tr>
<th>Prices from</th>
<th>Training / Services</th>
<th>Community support</th>
<th>Wash kits</th>
<th>Sequencing kit</th>
<th>Flow cells</th>
<th>DNA/RNA starter pack</th>
<th>Sequencing kit included</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000.00</td>
<td>Optional</td>
<td>Included</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>14</td>
<td>Base</td>
</tr>
<tr>
<td>$4,500.00</td>
<td>1 day workshop</td>
<td>Included</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>Enhanced</td>
</tr>
<tr>
<td>$12,700.00</td>
<td>Project support</td>
<td>Included</td>
<td>1</td>
<td>3</td>
<td>14</td>
<td>1</td>
<td>Project</td>
</tr>
</tbody>
</table>

- **Basic**: Bundles include flow cells, sequencing kits and support.
- **Enhanced**: Select either a DNA or RNA starter pack.
- **Project**: Only 1 starter pack per account.

### Select and configure your starter pack

- Range of bundles to suit your experimental requirements.
How is this possible? ... computers

Central dogma of molecular biology
Once we have empirical data, what do we do with it?

SmidgION

Nanopore sensing technology can uniquely be miniaturised for portable analysis of DNA and other biological molecules. The handheld MiniION is already established for portable DNA sequencing. Oxford Nanopore has now started developing an even smaller device, SmidgION.

Accessible tech

The end-to-end process of sample preparation, measurement and analysis for nanopore technology is becoming increasingly simplified. For example, new kits allow ten minute library preparation, the VioTRAX will provide programmable hands-off sample preparation, and Oxford Nanopore provides analysis workflows such as ‘What’s in my Pot’ (WIMP). As
Once we have empirical data, what do we do with it?
Once we have empirical data, what do we do with it?

What if diagnosing infectious diseases was as simple as asking Siri?
Once we have empirical data, what do we do with it?

“easy as 1 2 3 . . .
simple as do re mi”
Nursing has been here before . . .

| DNA | Transcription | RNA | Translation | Proteins |

Central dogma of molecular biology

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Photo Credit: http://hyperphysics.phy-astr.gsu.edu/hbase/Organa/dogma.html

Nursing has been here before . . .

“Florence was able to show that within six months after the team of nurses arrived at Scutari, the hospital mortality rates plummeted from 42.7% to 2.2%.” (Steele, 2017, p. 57)
Questions?

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Thank you