Poster Presentations are Effective Continuous Assessment Activities to Foster Integrated Learning by Undergraduate Pharmacy Students

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Cork, T12 YN60,
Ireland

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University College Cork,
West Lodge, Gaol Cross,
Cork,
Ireland

07 July 2018
Posters as Communication Tools
UCC BPharm / MPharm Integrated Programme

• Established in September 2015

• Multidisciplinary, integrated, systems-based modules – BPharm3 and BPharm4
  
  • PF3009 – Gastrointestinal, Hepatic and Endocrine Systems (S2)

Team-based, drug-themed poster presentation (50% CA, 15% Module)

• Knowledge integration and development of lifelong skills
Methods

- $n = 65, \ 51\♀ + 14\♂$
- Semester II – 8 weeks
- 16 teams of either 4 or 5 students
- Poster guidelines / training
- Resources – rubric, marking schemes
- Poster “conference” afternoon
- Assessor and student marking (CATME)
- Assessor and student feedback

Gastrointestinal
- Vedolizumab
- Linaclotide
- Loperamide

Hepatic
- Regorafenib
- Voxilaprevir

Endocrine
- Choriogonadotropin alfa
- Etecalcetide
- Vildagliptin
- Repaglinide
Minimum Poster Requirements

- Title
- Authors
- School of Pharmacy address
- UCC crest
- UCC School of Pharmacy logo
- Pharmacy-relevant topics directly related to the drug:
  - Pharmaceutical chemistry
  - Pharmacology
  - Pharmaceutics
  - Pharmacy practice
  - Clinical pharmacy
- References
- CCF behaviours

Minimum Poster Requirements:

- A0 size, portrait orientation

Poster:

**Voxilaprevir: C’you later hepatitis?**

**An integrated poster presentation**

Student A, Student B, Student C, Student D

School of Pharmacy, Cavanagh Pharmacy Building, University College Cork, T12YN60

Pharmacokinetics

- **Chemistry**
- **Pharmacology and Pharmacokinetics**
- **Pharmacy Practice**
- **Pharmaceutics**
- **Pharmaceutical chemistry**
- **Pharmacology**
- **Pharmacy practice**
- **Clinical pharmacy**

**Voxilaprevir** is a direct-acting antiviral agent that selectively inhibits NS3/4A protease, which is responsible for viral replication. Inhibition of this enzyme leads to the degradation of viral RNA and eventually a reduction in viral load, resulting in a cure. Voxilaprevir is an oral medication that can be administered as a single tablet daily for 8 weeks, with or without ribavirin. It is indicated for the treatment of chronic hepatitis C virus infection in adults with or without the NS5A inhibitor glecaprevir-pibrentasvir (G/P).

- **Table of Contents**
- **Introduction**
- **Methods**
- **Results**
- **Discussion**
- **Conclusion**

**References**

Poster Preparation and Presentation Student Resources

Better Posters
A RESOURCE FOR IMPROVING POSTER PRESENTATIONS - PART OF DOCTORZEN.NET

29 MARCH 2018
Link roundup for March 2018
Animate Science has a "done in one" blog post about how to design a poster.
Readers of the blog will find a lot of advice there familiar, but it's very well done. It's a much better "single serve" post than this blog is. (It's not fair to expect newbies to read through nine years of posts.)

http://betterposters.blogspot.com

How to Present an Academic Research Poster
https://www.youtube.com/watch?v=0ozwCEeaVWE

Poster Presentations as a Genre in Knowledge Communication
A Case Study of Forms, Norms, and Values
Anu MacIntosh-Murray
University of Toronto
Science Communication, 2007, 28 (3), 347 – 376
<table>
<thead>
<tr>
<th>Mark</th>
<th>Poster Team / Assessor Engagement</th>
</tr>
</thead>
</table>
| 0 – 3 | Assessor questions poorly addressed.  
 Poor team-assessor relationship.  
 One or more team members do not engage or engage passively.  
 Team shows poor ownership of its work.  
 Team exhibits minimal knowledge of poster content.  
 Team does not understand listed PSI Core Competency Framework (CCF) behaviours. |
| 4 – 6 | Assessor questions minimally addressed.  
 Adequate team-assessor relationship.  
 Team members exhibit acceptable engagement.  
 Team shows passive ownership of its work.  
 Team exhibits adequate knowledge of poster content.  
 Team satisfactorily understands relevance of listed PSI CCF behaviours. |
| 7 – 8 | Assessor questions confidently addressed.  
 Good team-assessor relationship.  
 All team members actively engage.  
 Team is satisfied with its quality of work.  
 Team exhibits comprehensive understanding of poster content.  
 Team can thoroughly justify listed PSI CCF behaviours mapped to the poster exercise. |
| 9 – 10 | Assessor questions expansively addressed.  
 Excellent team-assessor relationship.  
 All team members eagerly engage multiple times.  
 Team exhibits enthusiasm and is proud of its work.  
 Team demonstrates drug knowledge outside of the scope of the poster.  
 Team can suggest additional PSI CCF behaviours mappable to the overall poster exercise. |
<table>
<thead>
<tr>
<th>Team</th>
<th>Drug Poster</th>
<th>Poster Design / Layout (10 marks)</th>
<th>Poster Content (10 marks)</th>
<th>Poster Team – Assessor Engagement (10 marks)</th>
<th>TOTAL (30 marks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aprepitant</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Comments :</td>
<td></td>
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<tr>
<td>2</td>
<td>Naloxegol</td>
<td></td>
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<td></td>
<td></td>
<td>Comments:</td>
<td></td>
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</table>
CATME Peer Evaluation

Comprehensive Assessment of Team Member Effectiveness

- Contributing to the team’s work
- Interacting with teammates
- Having relevant knowledge, skills and abilities
- Keeping the team on track
- Expecting quality

www.info.catme.org
# CATME Peer Assessment Factor (PAF)

PAF: $>,$ $<$ or $= 1.00$

<table>
<thead>
<tr>
<th>Student</th>
<th>C</th>
<th>I</th>
<th>K</th>
<th>E</th>
<th>H</th>
<th>PAF (w/ Self)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.0</td>
<td>4.2</td>
<td>4.2</td>
<td>4.2</td>
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<td>4.2</td>
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<td>4.2</td>
<td>4.8</td>
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<td>4.8</td>
<td>4.2</td>
<td>4.8</td>
<td>4.8</td>
<td>1.06</td>
</tr>
</tbody>
</table>

**Student mark** $= \text{Average assessor team mark} \times \text{PAF}$
Entry Point – UCC Glucksman Gallery

• Poster = art work

• MUSE QUESTs *Entry Points to Learning through Art* questions

• Inquiry, access, reflection

• Teamwork, communication, observational skills and integrative learning

Project Zero, Harvard School of Education: [http://www.pz.harvard.edu/projects/project-muse](http://www.pz.harvard.edu/projects/project-muse)
<table>
<thead>
<tr>
<th>Narrative</th>
<th>Foundational</th>
<th>Experiential</th>
<th>Aesthetic</th>
<th>Logical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N1</strong>: What is the story that you see in this work of art? How do the colours help to tell this story?</td>
<td><strong>F1</strong>: Take a look at the works of art surrounding this one. Why do you think these objects are considered art?</td>
<td><strong>E1</strong>: If you were a colour in this work of art, what colour would you be? Why?</td>
<td><strong>A1</strong>: Look at the colours in this work of art. Was colour the first thing that you noticed? What else caught your eye?</td>
<td><strong>L1</strong>: What colour do you see the most of in this work of art? What colour do you see the least of in this work of art?</td>
</tr>
<tr>
<td><strong>N2</strong>: In the story that you see, who or what do you think is the most important figure, shape or object? What makes you think so?</td>
<td><strong>F2</strong>: What do you see in the work of art in front of you? Do you think everyone sees what you see?</td>
<td><strong>E2</strong>: Is there something that has happened in your own life that this work of art makes you think of?</td>
<td><strong>A2</strong>: Does this work of art express an idea or an emotion? Do the colours, lines, shapes, and movement help make that happen? How?</td>
<td><strong>L2</strong>: Find a hidden idea or emotion in this work of art. What is it and what clues helped you to find it?</td>
</tr>
<tr>
<td><strong>N3</strong>: What emotions seem to be expressed in this story? What makes you think so?</td>
<td><strong>F3</strong>: Is what you see in this work of art beautiful? Is it still art if it is not beautiful or it causes you to feel uneasy?</td>
<td><strong>E3</strong>: If this work of art is the artist’s half of a conversation to you, what do you say back to the artist?</td>
<td><strong>A3</strong>: Do you see movement in this work of art or does it seem still? Do the colours, lines, shapes make it seem that way? How?</td>
<td><strong>L3</strong>: Which object or shape did you see first in this work of art? Why do you think this is the first thing that you noticed?</td>
</tr>
<tr>
<td><strong>N4</strong>: Does anything you see happening in this work of art remind you of your own life story – or of another story you know?</td>
<td><strong>F4</strong>: Does this work of art speak to you? Is art a language? What is said through art that cannot be said through words?</td>
<td><strong>E4</strong>: Turn your back to this work of art. What one object or shape do you remember most clearly. Why do you think you remembered that object or shape?</td>
<td><strong>A4</strong>: What makes this work of art look real to you? What makes it look unreal?</td>
<td><strong>L4</strong>: If you wanted to know how the artist made this work of art, what questions would you ask?</td>
</tr>
</tbody>
</table>
Fernweh II, 2015, (152 x 244 cm), Janiana Tschäpe

**Foundational**

**F2:** What do you see in the work of art in front of you?

Do you think everyone sees what you see?
Fernweh II, 2015, (152 x 244 cm), Janiana Tschäpe
## Most Popular Entry Point Questions

<table>
<thead>
<tr>
<th>Narrative</th>
<th>Foundational</th>
<th>Experiential</th>
<th>Aesthetic</th>
<th>Logical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N1:</strong> What is the story that you see in this work of art?</td>
<td><strong>F2:</strong> What do you see in the work of art in front of you?</td>
<td><strong>E1:</strong> If you were a colour in this work of art, what colour would you be?</td>
<td><strong>A2:</strong> Does this work of art express an idea or an emotion?</td>
<td><strong>L2:</strong> Find a hidden idea or emotion in this work of art.</td>
</tr>
<tr>
<td>How do the colours help to tell this story?</td>
<td>Do you think everyone sees what you see?</td>
<td>Why?</td>
<td>Do the colours, lines, shapes, and movement help make that happen?</td>
<td>What is it and what clues helped you to find it?</td>
</tr>
</tbody>
</table>

(8/16) 50%  (6/16) 37.5%  (5/16) 31.25%  (6/16) 37.5%  (9/16) 56.25%
**E3: If this work of art is the artist’s half of a conversation to you, what do you say back to the artist?**

<table>
<thead>
<tr>
<th>Experiential Entry Point Reply</th>
</tr>
</thead>
</table>

“We would ask the artist what is the significance of this particular rock/boulder. We can see other rocks in the background, so why did he choose this one. We would ask the artist why he took this picture at such an angle. We get the impression that the artist is crouched down and took the photo while looking up at the rock. It would seem that the rock is towering over the artist and is all-consuming. We would ask does this represent a burden/problem which the artist cannot overcome, climb over or conquer. We would ask the artist why he chose to take the photo of the rock at such a close range. The rock takes up most of the picture. It is in the very centre. This gives us the impression that there is very little room to manoeuvre, and so the artist is stuck behind this rock. Thus, it appears that the artist cannot go around or climb over the rock, which represents his inability to overcome his problem.”

Poster Presentation Day
Aprepitant

Chemistry

Aprepitant is a high-affinity substance P receptor C antagonist.

Pharmacology

Aprepitant is a substance P receptor antagonist.

Clinical

Aprepitant is an antiemetic used in the prevention of nausea and vomiting usually due to cancer chemotherapy or post-surgery.

Brands include Emend and Ivenemid

References


Poster – PSI *Core Competency Framework* (CCF) Behaviours

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**CCF Behaviours**

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**References**


**Core Competency Framework behaviours achieved:** 2.4.1/2.4.5/4.4.6/4.5.1/4.5.2/4.5.3/4.5.5/4.5.7/5.2.4/5.3.1/6.1.1

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**References**

Poster Presentation Findings – Top 5 CCF Behaviours

1. Uses effective verbal, non-verbal, listening and written communication skills to communicate clearly, precisely and appropriately (2.4.1) (15/16)

2. Maintains a consistently high standard of work (1.2.8) (11/16)

3. Communicates and applies research findings (5.3.4) (10/16)

4. Demonstrates organisation and efficiency in carrying out their work (6.1.1) (10/16)

5. Identifies and utilises appropriate evidenced based sources of information on medicines (4.5.3) (9/16)
“Although our project ran late in time, the main bones of what was required was done well in advance and from there, ideas for formatting and poster design took the most time. All of our group brought unique skills to the table which enabled us to be a cohesive unit. We utilised each other’s strongest attributes rather than plugging away individually and producing a subpar product. We are very comfortable with one another as a group and the lack of ego’s in the group meant that when we each had our ideas for the poster, no one sulked if their idea wasn’t chosen but rowed in behind the current poster and contributed. This definitely contributed to these comfort levels. This enabled us to make as good a poster as we possibly could. In an event where we were potentially doing another poster I would jump at the opportunity to do it with this team again.”
Student Feedback – Glucksman Gallery (n = 54, 83%)

**Team Building Exercise**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Percentage</th>
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<tbody>
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<tr>
<td>4</td>
<td>46%</td>
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<tr>
<td>3</td>
<td>22%</td>
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<tr>
<td>2</td>
<td>8%</td>
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<tr>
<td>1</td>
<td>0%</td>
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**Initiate Poster Development**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Percentage</th>
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<tbody>
<tr>
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<td>24%</td>
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<tr>
<td>3</td>
<td>29%</td>
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<tr>
<td>2</td>
<td>26%</td>
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<tr>
<td>1</td>
<td>4%</td>
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</table>

**Creative Thinking**

<table>
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<th>Rating</th>
<th>Percentage</th>
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<tbody>
<tr>
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<tr>
<td>4</td>
<td>39%</td>
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<tr>
<td>3</td>
<td>13%</td>
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<tr>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>
Student Feedback (n = 54, 83%)

**Relevance of the Assessment**

- 5: 66%
- 4: 33%
- 3: 0%
- 2: 0%
- 1: 0%

**Interacting with Assessors**

- 5: 72%
- 4: 28%
- 3: 0%
- 2: 0%
- 1: 0%

New / enhanced skills acquired

- IT, PowerPoint®, presentation, teamwork
- organisational, creative, communication, collaboration
- condensing information
Poster Presentation Findings / Insights

• Authentic means of enhancing integration of knowledge and life skills

• Authentic method of BPharm assessment

• Expression of student creativity

• Suitable assessment in SII, BPharm3

• Engagement of students with the *CCF for Pharmacists – Life Long Learning*
Acknowledgements

• PF3009 2018 students

• School of Pharmacy faculty, postdocs, postgrads, administrative and technical staff

• MA (TLHE) Staff and students

• Dr. Marian McCarthy
<table>
<thead>
<tr>
<th>Mark</th>
<th>Poster Design / Layout</th>
<th>Poster Content</th>
<th>Poster Team / Assessor Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 3</td>
<td>No holistic design. Inadequate use of poster space. Poor use of colour / font. No aesthetic appeal. No unique selling point (USP).</td>
<td>Does not comply with minimum poster requirements. Graphics / text unclear, irrelevant and inaccurate. Includes incorrect, irrelevant information. Many grammar and spelling errors. Does not use a prop. No evidence of information integration. References irrelevant and not mapped to poster.</td>
<td>Assessor questions poorly addressed. Poor team-assessor relationship. One or more team members do not engage or engage passively. Team shows poor ownership of its work. Team exhibits minimal knowledge of poster content. Team does not understand listed PSI Core Competency Framework (CCF) behaviours.</td>
</tr>
<tr>
<td>9 – 10</td>
<td>Creative, all round design. Optimal spatial arrangement of content. Excellent use of colour / font. Exceptional and novel aesthetics. Exhibits a novel USP. Very engaging and eye catching.</td>
<td>Inclusion of information drug categories over and above minimum poster requirements. Exceptional synergism between graphics and text. Information is state-of-the-art and current. Symbiotic relationship between prop and poster. Transdisciplinary level of information integration. Evidence-based references used and thoroughly mapped to poster.</td>
<td>Assessor questions expansively addressed. Excellent team-assessor relationship. All team members eagerly engage multiple times. Team exhibits enthusiasm and is proud of its work. Team demonstrates drug knowledge outside of the scope of the poster. Team can suggest additional PSI CCF behaviours mappable to the overall poster exercise.</td>
</tr>
</tbody>
</table>
Student Guidelines for Glucksman Gallery

- Choose one work of art

- Choose **one** question from **each** of the **five entry point** categories

- Be non-judgemental and professional to team members replies to questions

- Ask team members “why do you see / say that”?

- Document student replies
Relevance of Entry Point Art Questions to the Poster

**Entry Point**

Experiential

**E3:** If this **work of art** is the artist's half of a conversation to you, what do you say back to the artist?

**Poster outset**

Experiential

**E3:** Consider your **poster** and prop as one half of a conversation.

Who will be the poster assessors?

Could you predict any questions you might be asked at the conference day by the assessors that cannot be directly answered by the poster itself or your prop?

**Poster completion**

Experiential

**E3:** Consider your **poster** and prop as one half of a conversation.

If you were a poster assessor, what questions would you ask or conversations would you instigate with the poster team?
Voxilaprevir: C’ you later hepatitis?
An integrated poster presentation
Student A, Student B, Student C, Student D
School of Pharmacy, Cavanagh Pharmacy Building, University College Cork, T12YNN0

Pharmacology and Pharmacokinetics

Mechanisms of action
Voxilaprevir is cleared as a mononuclear phosphonate. HCV NS3A interferes with the activity of the NS3A/4A proteinase by cleaving a Factor Xa-like convertase. Voxilaprevir inhibits the Factor Xa-like convertase by competitive inhibition, resulting in the accumulation of NS3A/4A proteinase inhibitors. Voxilaprevir is a potent and selective inhibitor of the NS3A/4A proteinase. Voxilaprevir has a dissociation constant of 0.6 nM, which is consistent with the results of prior studies.

Clinical
The pharmacokinetic profile of Voxilaprevir is consistent with the results of prior studies. Voxilaprevir is well tolerated and has a low incidence of adverse events. The most common adverse events reported in clinical trials are headache, fatigue, and nausea. The incidence of adverse events is similar across treatment groups and is consistent with the results of prior studies.

To:

Subject: Gilead Medical Information enquiry (GB3005)

13th February 2018

Our Ref: GB-AMS-Feb18-3005E-Letter

Dear Mr Hudson,

Thank you for your interest in our product Vosevi 400 mg/100 mg/100 mg film-coated tablets (sofosbuvir, velpatavir, voxilaprevir).

I understand you requested information about the chemistry of the product.

As you may be aware the Summary of Product Characteristics (SPC) states in section 5.1,

“Sofosbuvir is a pan-genotypic inhibitor of the HCV NS3B RNA-dependent RNA polymerase, which is required for viral replication. Sofosbuvir is a nucleotide prodig that undergoes intracellular metabolism to form the pharmacologically active uracil analogue triphosphate (GS-461203), which can be incorporated into HCV RNA by the NS5B polymerase and acts as a chain terminator. In a biochemical assay, GS-461203 inhibited the polymerase activity of the recombinant NS3B from HCV genotype 1b, 2a, 3a, and 4a. GS-461203 is neither an inhibitor of human DNA and RNA polymerases nor an inhibitor of mitochondrial RNA polymerase.

Velpatavir is a pan-genotypic HCV inhibitor targeting the HCV NS5A protein, which is required for viral replication.

Voxilaprevir is a pan-genotypic inhibitor of the HCV NS3/4A protease. Voxilaprevir acts as a noncovalent, reversible inhibitor of the NS3/4A protease.”

Unfortunately, we are unable to supply any further information other than what is available in the SPC and Patient Information Leaflet (PIL).

Gilead Sciences Ltd is providing this information as a professional courtesy. Some of the information contained in this response may be outside of the product labelling for Vosevi 400 mg/100 mg/100 mg film-coated tablets. This e-mail is not intended to offer an opinion regarding the advisability of administering Vosevi 400 mg/100 mg/100 mg film-coated tablets in a manner inconsistent with the product labelling. Please consult the Summaries of Product Characteristics for complete product information. The SMPC can be found on the electronic medicines compendium website at the following address: http://www.medicines.org.uk.

I hope this information is useful. However, if I can be of further assistance, please do not hesitate to contact us again.
Voxilaprevir

Pharmaceutics and Formulation

Voxilaprevir is available as Vosevi® - a combination film coated tablet containing sofosbuvir, velpatasvir and voxilaprevir, 400/100/100 mg respectively.

Tablet core:
- Colloidal anhydrous silica
- Anticaking agent.
- Copovidone - Film-forming agent.
- Croscarmellose sodium - Tablet disintegrant.
- Lactose monohydrate - Tablet binder.
- Magnesium stearate - Tablet lubricant.
- Microcrystalline cellulose - Direct compression excipient/Tablet diluent.

Film-coating:
- Iron oxide black (E172) - Colourant.
- Iron oxide red (E122) - Colourant.
- Iron oxide yellow (E172) - Colourant.
- Macrogol - Coating agent/tablet lubricant.
- Polyvinyl alcohol - Film-forming agent.
- Talc - Tablet lubricant.
- Titanium dioxide (E171) - Coating agent/pigment.

Primary packaging:
A white HDPE bottle with polypropylene continuous thread child-resistant cap. Lined with induction activated aluminium foil. Each bottle contains silica gel desiccant and polyester coil.

Main process steps:
- Blending and milling
- Roller compaction
- Milling and blending
- Compression
- Film-coating
- Packaging

Chemistry

Voxilaprevir
Structural formula: C_{48}H_{57}F_{7}N_{7}O_{9}S
Molecular weight = 868.94 g mol\(^{-1}\)

Structurally it is a macrocyclic compound. A highly permeable but poorly water soluble compound BCS class II. It contains 8 chiral centres and is produced as a single stereoisomer.

Physicochemical properties of voxilaprevir\(^{2}\)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>LogP</td>
<td>4.9</td>
</tr>
<tr>
<td>pKa (Strongest Acid)</td>
<td>3.74</td>
</tr>
<tr>
<td>pKa (Strongest Basic)</td>
<td>-0.84</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>0.0506 mg/ml</td>
</tr>
<tr>
<td>Lipinski’s Rule of 5</td>
<td>No</td>
</tr>
</tbody>
</table>

Voxilaprevir is synthesised in 6 synthetic steps using well defined starting materials. It is isolated as a single polymorph from an ethyl acetate solvate, which on drying can be removed to produce the amorphous form of voxilaprevir. It is a white to light brown crystalline hygroscopic solid.\(^{2}\)
**Mechanism of action:**
Structurally, voxilaprevir is classed as a macrocyclic peptidomimetic HCV NS3/4A protease inhibitor. It exerts its anti-viral action by reversibly binding and inhibiting non structural protein 3 (NS3) and cofactor non structural protein 4A (NS4A) serine protease of the hepatitis C virus.\(^1\)

NS3/NS4A is responsible for cleavage of genetic material into structural and non-structural proteins required for assembly into mature virus: NS3, NS4A, NS4B, NS5A and NS5B.

Voxilaprevir inhibits NS3/NS4A’s direct function and is considered a Direct Acting Antiviral Therapy.

**Pharmacology and Pharmacokinetics**

- **A**
  - Median peak concentration achieved 4-hours-post dose.
  - AUC\(_{0-24}\) 4,041ng/hr/ml and C\(_{max}\) 311ng/ml.
  - Co-administration with food causes AUC\(_{0-Inf}\) - 112-435% C\(_{max}\) - 147-680%. \(^1\)

- **D**
  - Greater than 99% protein bound.
  - Unbound plasma concentration increases 2-fold in severe hepatic impairment. \(^2\)

- **M**
  - Voxilaprevir is a substrate of CYP3A4, P-gp, BCRP, OATP1B1 and OATP1B3. \(^2\)

- **E**
  - In human ADME studies 94% of \([\text{\textsuperscript{14}}\text{C}]\) voxilaprevir was found in faeces. 39.8% as the parent molecule, 22.1% of M19 via sulphonamide hydrolysis. \(^2\)
Voxilaprevir

What is hepatitis C?
Hepatitis C is a disease of the liver caused by a specific hepatitis C virus (HCV). The liver is one of the most important organs in the body and is responsible for a wide range of functions such as detoxification, digestion, storage of vitamins and minerals, and it is responsible for making plasma proteins such as albumin and clotting factors. When a person becomes infected with the hepatitis C virus, there may not be symptoms for many years, resulting in the patient not knowing that they have been infected until the virus has caused serious damage to the liver.

The hepatitis C virus
The genome of the virus was first cloned and sequenced in 1989. Therefore, our knowledge on the virus is relatively new. It is transmitted via the sexual, parenteral, and perinatal routes. HCV genus is of the virus family Flaviviridae. It is a spherical enveloped virus of approximately 50 nm in diameter. Its genome is a (+) ssRNA molecule which encodes at least three structural and six nonstructural proteins. The HCV can be classified into six major genotypes and more than 50 subtypes. Generally, each patient is only infected with one genotype, but each genotype is a mixture of closely related viruses called a quasi-species. This characteristic makes the virus very susceptible to mutation.

Disease progression
For some people, the disease will only last a short period and their own immune system will clear the virus. However, the illness will progress to a chronic state in 80% of cases. Of this 80%, approximately 20% will develop cirrhosis and 5% will progress to liver failure, cancer, or other extremes of the disease.

Factors that can affect the disease progression:
- Age and duration of infection
- Alcohol consumption
- Comorbidities
- Gender
- Genetics
- Genotype

Epidemiology: Approximately 150 million people globally are infected with chronic hepatitis C. In 2015, there were 675 cases of hepatitis C in Ireland.
## Contributing to the Team's Work

<table>
<thead>
<tr>
<th>Student name 1</th>
<th>Student name 2</th>
<th>Student name 3</th>
<th>Student name 4</th>
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<td>Description of Rating</td>
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<td><strong>Does more or higher-quality work than expected.</strong></td>
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<td><strong>Makes important contributions that improve the team’s work.</strong></td>
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<td><strong>Helps teammates who are having difficulty completing their work.</strong></td>
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<td>Demonstrates behaviors described immediately above and below.</td>
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<td><strong>Completes a fair share of the team’s work with acceptable quality.</strong></td>
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<td><strong>Keeps commitments and completes assignments on time.</strong></td>
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<td><strong>Helps teammates who are having difficulty when it is easy or important.</strong></td>
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<td>Demonstrates behaviors described immediately above and below.</td>
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<td><strong>Does not do a fair share of the team’s work. Delivers sloppy or incomplete work.</strong></td>
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<td><strong>Misses deadlines. Is late, unprepared, or absent for team meetings.</strong></td>
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<td><strong>Does not assist teammates. Quits if the work becomes difficult.</strong></td>
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The **Core Competency Framework for Pharmacists (CCF)**

- Composed of
  - 6 Domains
  - 25 Competencies
  - 168 Behaviours

<table>
<thead>
<tr>
<th>Domain</th>
<th>Competency</th>
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| Professional practice         | Practises ‘patient-centred’ care  
                              | Practises professionally  
                              | Practises legally  
                              | Practises ethically  
                              | Engages in appropriate continuing professional development |
| Personal skills               | Leadership skills  
                              | Decision-making skills  
                              | Team working skills  
                              | Communication skills |
| Supply of medicines           | Manufactures and compounds medicines  
                              | Manages the medicines supply chain  
                              | Reviews and dispenses medicines accurately |
| Safe and rational use of medicines | Patient consultation skills  
                                      | Patient counselling skills  
                                      | Reviews and manages patient medicines  
                                      | Identifies and manages medication safety issues  
                                      | Provides medicines information and education |
| Public health                 | Population health  
                              | Health promotion  
                              | Research skills |
| Organisation and management skills | Self-management skills  
                                      | Workplace management skills  
                                      | Human resources management skills  
                                      | Financial management skills  
                                      | Quality assurance |

**Domain 2 - Personal Skills**

- Competency: 2.1 Leadership skills
- Behaviours:
  - 2.1.1 Inspires confidence and applies assertiveness skills as appropriate
  - 2.1.2 Leads by example by acting to ensure patient safety and quality within the pharmacy environment
Glucksman Gallery – MUSE QUESTs

Brian Maguire, *Erika Perez Escobedo*, 2012, acrylic on linen, 81.5 x 73 cm