

# Cyclometalated palladium photosensitizers for photodynamic therapy: synthesis and PEGylation

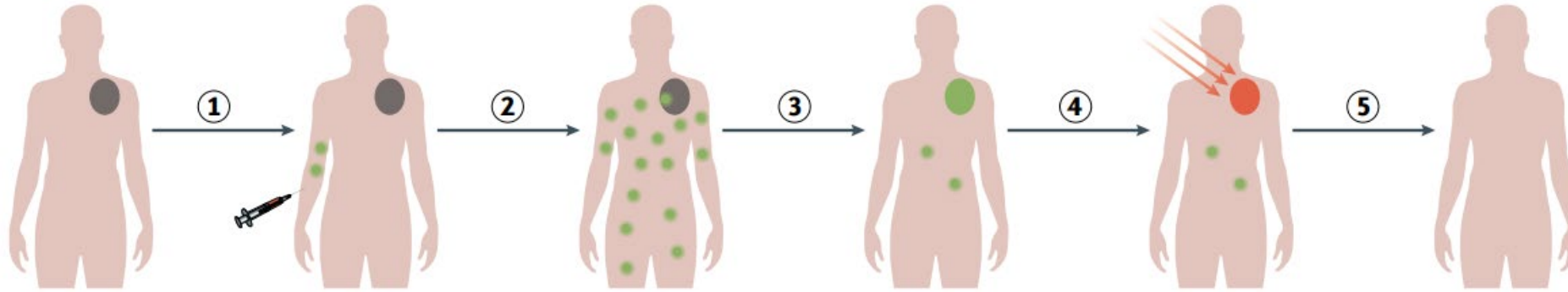
Mohamed Abdelsalam, University of the South: Sewanee  
Leiden University

# Introduction

- Born in Giza, Egypt.
- 4th year BSc student at the University of the South.
- Studying chemistry and mathematics.
- Fun(?) fact: I can type fast.



# Photodynamic Therapy (PDT)



Uses light-activated drugs (photosensitizers) to kill cancer cells.

Has received considerable attention compared to conventional cancer treatments:

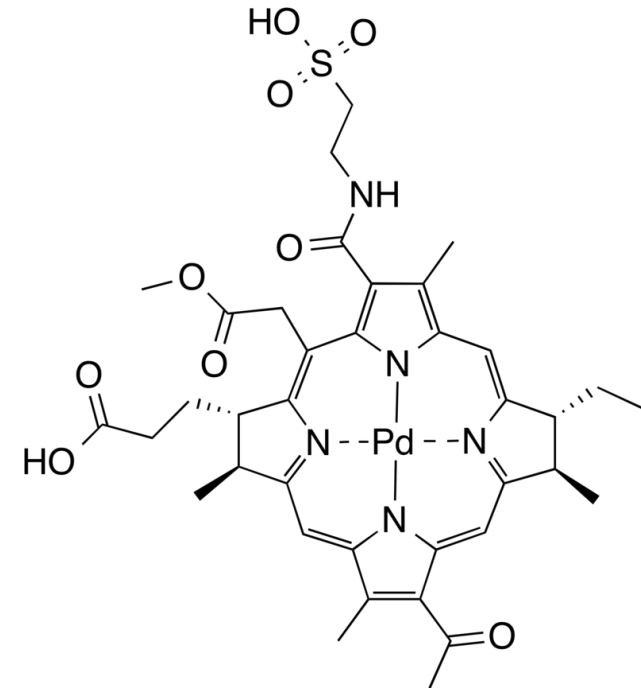
- Non-invasive.
- High cure rates.
- Low side effects.

Li, X.; Lovell, J. F.; Yoon, J.; Chen, X. *Nat Rev Clin Oncol* 2020, 17 (11), 657–674.

# Photosensitizers

An ideal photosensitizer should exhibit (to name a few):

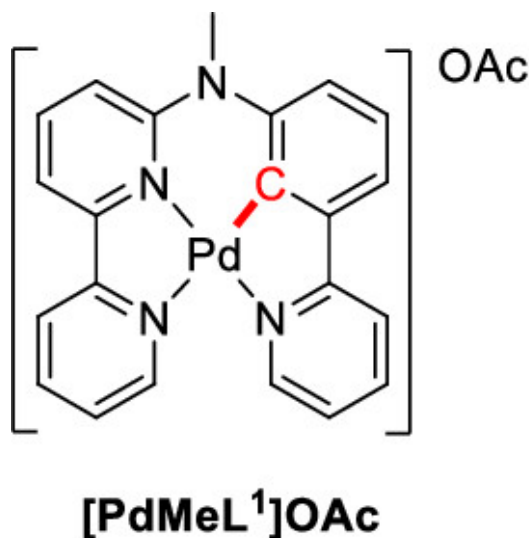
- Good water solubility.
- Low dark cytotoxicity.
- Absorption of higher-wavelength light (red to NIR).
- Rapid clearance from the body.



**Padeliporfin**

# Cyclometalated Photosensitizers

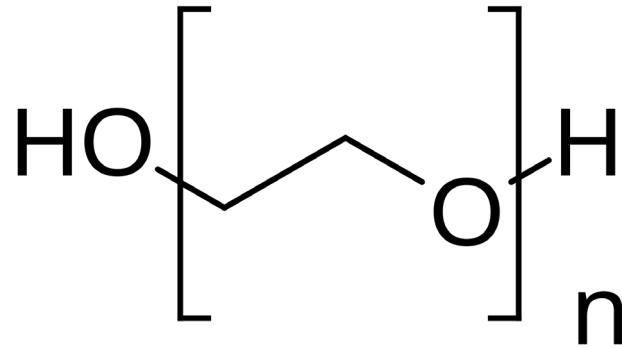
- Cyclometalated complexes exhibit an E–M–C structure (E is group 15 or 16 donor atom, M is metal, and C is carbon)
- Significant red shift of their absorption maxima compared to other types.
- However, they suffer from low water solubility.



Zhou, X.-Q.; Xiao, M.; Vadde Ramu; Hilgendorf, J.; Li, X.; Panagiota Papadopoulou; Siegler, M. A.; Kros, A.; Sun, W.; Bonnet, S. *Journal of the American Chemical Society* 2020, 142 (23), 10383–10399.

# PEGylation

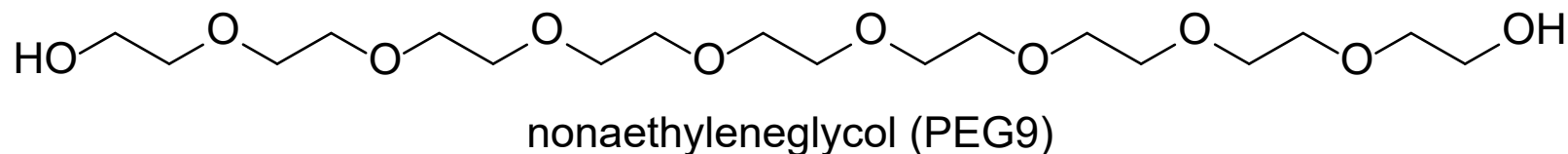
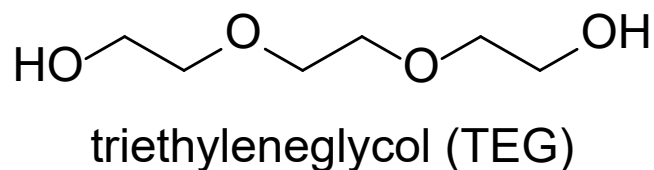
- Attachment of a polyethyleneglycol (PEG) functional group to photosensitizers.
- Has been shown to increase water solubility to hydrophobic drugs and proteins.



**Polyethyleneglycol (PEG)**

# Project Goals

- Synthesis of cyclometalated palladium(II) photosensitizers.
- Improve hydrophilicity of photosensitizers through PEGylation.
- Determine the effect of varying the PEG group's chain length on hydrophilicity.



# Thank you!

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