Comparative Positron-Emission Tomography (PET) Imaging and Phototherapeutic Potential of ^{124}I- Labeled Methyl- 3-(1′-iodobenzyloxyethyl)pyropheophorbide-*a* vs the Corresponding Glucose and Galactose Conjugates

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Abstract

In our present study, 3-(1′-*m*-iodobenzyloxyethyl)pyropheophorbide-*a* methyl ester **1**, 3-(1′-*m*-iodobenzyloxyethyl)-17^2-{(2-deoxy)glucose}pyropheophorbide-a **2**, and 3-(1′-*m*-iodobenzyloxyethyl)-17^2-{(1-deoxy)-galactose}pyropheophorbide-a **3** were synthesized and converted into the corresponding ^{124}I-labeled analogues by reacting the intermediate trimethyltin analogues with Na^{124}I. Photosensitizers **1**−**3** were evaluated for the PDT efficacy in C3H mice bearing RIF tumors at variable doses and showed a significant long-term tumor cure. Among the compounds investigated, the non-carbohydrate analogue **1** was most effective. These results were in contrast to the in vitro data, where compared to the parent analogue the corresponding galactose and glucose derivatives showed enhanced cell kill. Among the corresponding ^{124}I-labeled analogues, excellent tumor images were obtained from compound **1** in both tumor models (RIF and Colon-26) and the best tumor contrast was observed at 72 h after injection. Conjugating a glucose moiety to photosensitizer **1** initially diminished its tumor uptake, whereas with time the corresponding galactose analogue showed improved tumor contrast.