

## ***“Expanded Porphyrins: A Personal Journey”***

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Expanded porphyrin is a term we introduced into the literature in 1988 to describe larger homologues of natural and synthetic tetrapyrrolic macrocycles. Expanded porphyrins, along with many other contracted, isomeric, and core-modified porphyrin analogues, are now known. Expanded porphyrins, in particular, have seen application in areas as diverse as anion recognition and transport, self-assembly, liquid-liquid ion extraction, photodynamic therapy, and anticancer drug development. In recent years expanded porphyrins have helped increase our understanding of aromaticity and antiaromaticity. In this lecture, an update on recent systems that have been synthesized as possible drug leads will be presented. Also discussed will be systems that support unexpected electronic configurations, including unusual  $[4n+1]$   $\pi$ -electron semi-aromatic peripheries or which support expanded porphyrin-based self-assembly. New work involving 3D-aromaticity will also be presented.

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### **Lead References**

- Sessler, J. L.; Murai, T.; Lynch, V.; Cyr, M. *J. Am. Chem. Soc.* **1988**, *110*, 5586-5588.
- Sessler, J. L.; Miller, R. A. *Biochemical Pharmacology* **2000**, *59*, 733-739.
- Sessler, J. L.; Seidel, D. *Angew. Chem.* **2003**, *115*, 5292-5333; *Angew. Chem. Int. Ed.* **2003**, *42*, 5134-5175.
- Ishida, ; Kim, S.-J.; Preihs, C.; Ohkubo, K.; Lim, J. M.; Lee, B. S.; Park, J. S.; Lynch, V. M.; Roznyatovskiy, V. V.; Sarma, T.; Panda, P. K.; Lee, C. H.; Fukuzumi, S.; Kim, D.; Sessler, J. L. *Nature Chem.* **2013**, *5*, 15-20.
- Thiabaud, G.; Arambula, J. F.; Siddik, Z. H.; Sessler, J. L. *Chem. Eur. J.* **2014**, *20*, 8942-8947.
- Zhang, Z.; Kim, D. S.; Lin, C.-Y.; Zhang, H.; Lammer, A. D.; Lynch, V. M.; Popov, I.; Miljanić, O. S.; Anslyn, E. V.; Sessler, J. L. *J. Am. Chem. Soc.* **2015**, *137*, 7769-7774.
- Cha, W.-Y.; Kim, T.; Ghosh, A.; Zhang, Z.; Ke, X.-S.; Ali, R.; Lynch, V. M.; Jung, J.; Kim, W.; Lee, S.; Fukuzumi, S.; Park, J. S.; Sessler, J. L.; Chandrashekar, T. K.; Kim, D. “Bicyclic Baird-type Aromaticity,” *Nature Chem.*, online. DOI: 10.1038/NCHEM.2834

Prof. Jonathan L. Sessler was born in Urbana, Illinois, USA on May 20, 1956. He received a B.S. degree (with Highest Honors) in chemistry in 1977 from the University of California, Berkeley. He obtained a Ph.D. in organic chemistry from Stanford University in 1982 (supervisor: Professor James P. Collman). He was a NSF-CNRS and NSF-NATO Postdoctoral Fellow with Professor Jean-Marie Lehn at L'Université Louis Pasteur de Strasbourg, France. He was then a JSPS Visiting Scientist in Professor Tabushi's group in Kyoto, Japan. In September 1984 he accepted a position as Assistant Professor of Chemistry at the University of Texas at Austin, where he is currently the Doherty-Welch Chair. Dr. Sessler has authored or coauthored over 650 research publications, written two books (with Dr. Steven J. Weighorn and Drs. Philip A. Gale and Won-Seob Cho, respectively), edited two others (with Drs. Susan Doctrow, Tom McMurry, and Stephen J. Lippard, Placido Neri and Mei-Xiang Wang), and been an inventor of record on over 75 issued U.S. Patents. To date, Dr. Sessler's work has been featured on more than 40 journal or book covers. His current H-index is 95. Dr. Sessler is an Associate Editor for *ChemComm*. Dr. Sessler is a co-founder (with Dr. Richard A. Miller) of Pharmacyclics, Inc., which was acquired by AbbVie for \$21B in 2015. He is currently launching Cible, Inc. with Dr. Jonathan F. Arambula and Ms. Karen Strnad. Dr. Sessler has served as the co-organizer of several international conferences in porphyrin, supramolecular, and macrocyclic chemistry and numerous ACS symposia. In addition to English, he speaks French, Spanish, German, and Hebrew reasonably well and can get by in Japanese. He struggles with Korean. Dr. Sessler's work has been recognized with several awards, including the ACS Cope Scholar Award, the RSC Centenary Prize, the Southwest Regional ACS Award, the Molecular Sensors-Molecular Logic Gates Award, and the Hans Fischer Award. He was recently elected to the U.S. National Academy of Inventors and was named Inventor of the Year at The Univ. of Texas at Austin in 2016.

