Commentary by the Winners of the 22nd *Journal of Oleo Science* Editor's Award

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We are extremely pleased and honored for being selected as the winner of the 22nd *Journal of Oleo Science* Editor's Science Impact Award of the year 2019 for our recent contribution, *Dry Thermotropic Glycolipid Self-Assembly: A Review* *J. Oleo Science, Vol.67, No.6 (2018)*. The news of was indeed a pleasant surprise and we are very thankful to the Editorial Board.

Since nearly 20 years ago our group started its research in glycolipid motivated by the fact that this material could form liquid crystalline phases in the dry state. Thus when invited by JoS to write a review, this topic came naturally to our mind. Of course in the beginning we knew almost nothing on this subject since glycolipids are known mostly as biomaterials and related mostly to the lyotropic liquid crystal phases. Systematic research in the dry thermotropic state of the material was scanty. Thus these early years were our own learning experience and remains so till these days. Almost by chance we made the double chain Guerbet glycoside series, and found that this structure mimics closely the glycerol base glycosides, which can be found naturally. We had studied both the thermotropic and lyotropic phases of the materials but this review is limited to the former. Sugar stereochemistry has been studied extensively by many authors. However, our focus is on the sugar lipid and its liquid crystal property which basically originates from the network of hydrogen bond interactions in the self-assembly. The presence of many hydroxy groups at different positions and orientations adds to the complexity. In particular, the review scrutinizes how the variation of sugar stereochemistry (e.g. anomer vs. epimer), the chain length and chain branching affect the formation of thermotropic liquid crystals phases, which not only located un-

der equilibrium but also far from equilibrium conditions (glassy phase). Computational methods were used to assist in our understanding but we are far from having a complete knowledge of the subject and for future research there are many interesting aspects to improve and explore such as the sugar cooperativity. Comparing many linear glycosides with those of Guerbets (both in the anhydrous state), the former gives mainly the smectic phase while the latter will give smectic, hexagonal and cubic phases. Thus revealing the role of the branch chain and chain asymmetry in promoting non-lamellar curve phases. In amphiphilic material, the driving force of self-assembly is due to the segregation of the hydrophilic group from the hydrophobic group and the head group is not allowed to interact with the chain. However, in sugar lipid, the interaction of alkyl chain with the head group is possible but rare. Although this interaction was observed in the dry condition, it may explain the lipid flip in cell membrane, a rare event but important for cell apoptosis. The dry glycolipid assembly has been subjected to the electric and magnetic fields and the results show interesting behaviors including a possible transient current generation. Here we would like to thank our students and collaborators (past and present) worldwide who have been supporting our research endeavor. We also thank the numerous research grants nationally and internationally we have received so far.

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