# Sodium-Glucose Co-Transporters 2 Inhibitors: A Novel and Multi-Faceted Therapy of Diabetes

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### Abstract (300 word limit)

Over the past few years, Sodium-Glucose co-Transporters 2 inhibitors (SGLT2i) have emerged as a prominent and efficient hypoglycemic agent with substantial benefits of weight loss and low risk of hypoglycemia. These agents block the reabsorption of the filtered glucose and sodium at the renal proximal tubule, explaining the glucose lowering and also the mild blood pressure lowering effects, in addition to the potential and interesting cardiac and renal protective benefits observed in trials. Cardiovascular outcomes studies of empagliflozin, canagliflozin and dapagliflozin, conducted on thousands of patients over several years, showed a significant reduction in major cardiovascular events in patients with established cardiovascular disease, as well as a reduced incidence of hospitalization for heart failure and a slower progression of kidney disease across all studies. These impressive findings led the authors of the 2019 American Diabetes Association guidelines to recommend SGLT2i as a second line agent for diabetes, after Metformin, in patients with established cardiovascular disease, congestive heart failure or chronic kidney disease. Nevertheless, providers should be familiar with the safety profile of these medications, including the increased risk of mycotic genital infections, urinary tract infections, and possibly fractures associated with their use. Canagliflozin use has been linked to a higher risk of lower limb amputations whereas euglycemic diabetes ketoacidosis has been reported with the use of different SGLT2i. Therefore, SGLT2i therapy is not recommended in type 1 diabetes patients, or patients at high risk of ketoacidosis or amputation. More studies are currently undergoing with the goal of examining the effect of SGLT2i in patients with established chronic kidney disease and congestive high failure, as well as the long term benefits and effects of these medications.

### Recent Publications (minimum 5)

1. ADA Standard of Medical Care in Diabetes 2019 (2019). Diabetes Care January 01 2019; volume 42 issue Supplement
2. Zinman B, Wanner C, Lachin JM et al, EMPA-REG OUTCOME Investigators (2015) Empagliflozin, Cardiovascular Outcomes, and Mortality in Type 2 Diabetes. N Engl J Med. 373(22):2117.
3. Neal B, Perkovic V, Mahaffey KW et al, CANVAS Program Collaborative Group (2017). Canagliflozin and Cardiovascular and Renal Events in Type 2 Diabetes. N Engl J Med. 377(7):644
4. Wiviott SD, Raz I, Bonaca MP et al, DECLARE-TIMI 58 Investigators (2019). Dapagliflozin and Cardiovascular Outcomes in Type 2 Diabetes. N Engl J Med. 380 (4):347
5. Zelinker TA, Wiviott SD, Raz I et al (2019) SGLT2 inhibitors for primary and secondary prevention of cardiovascular and renal outcomes in type 2 diabetes: a systematic review and meta-analysis of cardiovascular outcome trials. Lancet 393 (10166):31

 Biography (150 word limit)

Dr Jocelyne Karam is the director of the division of Endocrinology at Maimonides Medical Center and an Associate Professor of Medicine at State University of New York, Downstate Medical Center in Brooklyn, New York, USA. Dr Karam treats patients with diverse endocrinology disorders but prominently patients with diabetes. She has been very active teaching, speaking in different venues and writing about different endocrinology topics with a focus on diabetes, obesity and diabetes prevention.

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**Notes/Comments:**