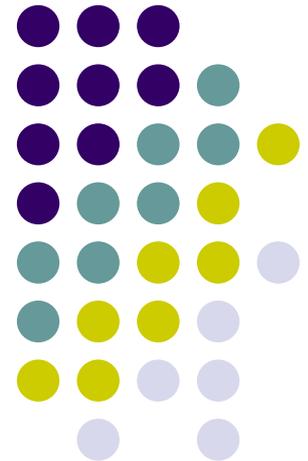


Incretin Mimetics

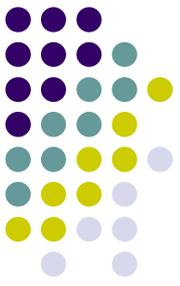
A New Direction in Diabetes Treatment

Carrie McLaughlin, FNP, CDE

Redding Rancheria Indian Health, Redding, Ca.

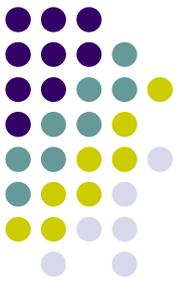


Redding Rancheria Indian Health Clinic, Redding, Ca.



- Active user population 7500 registered patients eligible for service. 3500-4000 seen in the clinic per year. Approximately 20,000 patient visits per year. Primary tribes Wintu, Yana and Pit River.
- 311 active Native American diabetics. 283 type 2 DM, 10 type 1 DM and 18 prediabetics.
- Participating in “Healthy Heart” competitive grant program. Currently have 74 “Healthy Heart” participants.
- 7 medical providers: 3 DO, 1 MD, 2 PA, 1 FNP, CDE. 1 part-time RD, CDE. 1 part-time “life coach” for “Healthy Heart.”
- “Diabetes Focus Group” educational activity once a month attended by approximately 50 diabetics.
- Podiatry clinic half-day every other week.
- Mental health services. 1 Ph.D., 1 MFT.

History of Diabetes Treatments

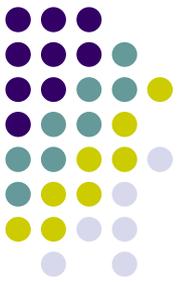


- Diet
- Insulin
- Sulfonylureas
- Metformin
- TZD's
- Meglitinides
- Incretin Mimetics

Basic Pathophysiology of Type 2 DM

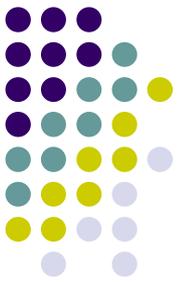


- Insulin resistance
- Hepatic gluconeogenesis
- Insulin deficiency
- Alterations in gastric emptying
- Alterations in incretin hormone production



Obesity and Type 2 DM

- Causal relationship between overweight and diabetes.
- High level of abdominal distribution of fat linked to insulin resistance.
- Other intrinsic metabolic issues not well understood.
- Emotions and weight.



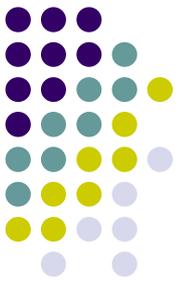
Incretins

- Gut hormones that enhance insulin secretion in response to food even before blood sugar values become elevated.
- Slow rate of absorption of nutrients into blood stream by reducing gastric emptying (which may contribute to decreased food intake).
- Inhibit release of glucagon.
- Diminished in type 2 DM.



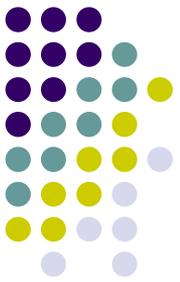
2 Incretin Molecules

- Glucagon Like Peptide-1 (GLP-1).
- Gastric Inhibitory Peptide (GIP).
- Both molecules are rapidly inactivated by the enzyme Dipeptidyl Peptidase 4 (DDP-4).



GLP-1 Effects in Humans

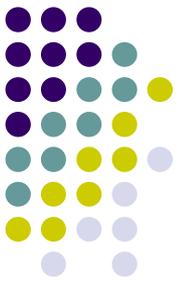
- GLP-1 secreted upon the ingestion of food.
- Increases Beta Cell responsiveness: enhances glucose dependent insulin secretion.
- Causes decreased Beta Cell workload.
- Effects Alpha Cells by decreasing after meal Glucagon secretion.
- Decreased Glucagon secretion reduces hepatic glucose output.
- Helps regulate gastric emptying.
- Promotes Satiety and reduces appetite.



2 Incretin Medications

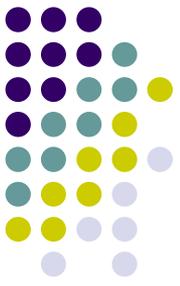
- 1) Byetta (Exenatide): Synthetic GLP-1.
- 2) Januvia (Sitagliptin Phosphate): DDP-IV inhibitor.

Byetta (Exenatide)



- Injectable medication.
- Indicated for use in type 2 diabetics who are also using Metformin and/or Sulfonylurea.
- Dosage ranges of 5mcg or 10 mcg
- Injected 1 hour before breakfast and dinner
- Works to decrease after meal blood sugar excursions, as well as appetite.

Byetta



- Synthetic version of salivary protein found in the Gila Monster.
- More than 50% overlap with the human GLP-1.
- Following injection, Exenatide is measurable in plasma for up to 10 hours whereas human GLP-1 has a very short half-life (<2 minutes).



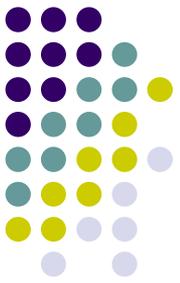
RRIHC and Byetta

- “Healthy Heart” formulary medication.
- Combat dual issues in diabetics: hyperglycemia and obesity.
- Cost: Government pricing 5mcg \$103.93/mo., 10mcg \$123.93/mo. Many patients also insured.
- Patient willingness for initiation.
- Pharmacy issues for ordering.



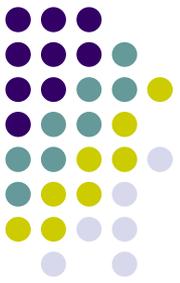
Patient Base

- 28 Healthy Heart patients between years one and two currently using Byetta.
- 3 patients previously prescribed Byetta on Healthy Heart have discontinued the medication for varied reasons. 1 for pregnancy, 1 for persistent nausea and 1 for persistent hyperglycemia.



Healthy Heart Year One

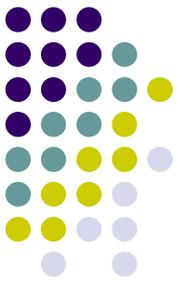
- Total participant group 43.
- 17 year one participants initiated Byetta at some point during the year (range 3-9 months).
- Overwhelming positive patient response.
- Average weight loss 7.9% total body weight (range 2-64#).
- Average starting A1c 7.3% (range 5.8%-13%).
- Average ending A1c 6.6% (range 5.3%-8.1%).



Quality of Life Issues

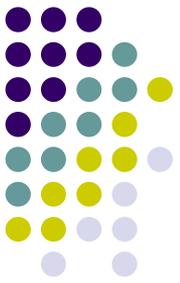
- Perceived feelings of increased energy.
- More commitment to exercise program.
- Healthier eating choices desired. Less indulgence and binge eating reported.
- Greater sense of self-efficacy.

Case Study



- 49 year old male with 2 year h/o type 2 DM.
- Significant weight issues.
- Diabetes controlled on Starlix and Actos combination. A1c prior to Byetta 6.2%.
- Initiated Byetta May 2006 to optimize dual benefit of med (Starlix d/c at initiation).
- Starting weight 346#. Current weight 282#. Total weight loss=64# or 18.5% of total body weight.
- Improved mood and outlook. Previously had never exercised regularly. Now goes to the gym 6d/wk. Does 1 hour of cardio and 30 minutes of weights each time.
- Current A1c 5.3%.

Case Study



- 72 year old male with h/o type 2 DM for 21 years.
- Always has struggled with weight.
- Eating right (counting calories, monitoring portion size, etc) and regular exercise routine at gym 3x/wk but unable to lose weight for years.
- Diabetes controlled on 70/30 insulin since diagnosis. A1c prior to starting Byetta 6.7%.
- Changed to Byetta and Starlix combo June 2006 successfully.
- Weight at initiation of Byetta 232#. Current weight 196#. Total current loss= 36# or 15.5% of total body weight.
- Depression significantly improved. Has returned to work after more than 20 years in retirement because he “feels so good.”
- Current A1c 6.2%.