Closer Look

GTC Bio Diabetes Summit

April 23-25, 2014; Cambridge, MA; Day #3 Highlights - Draft

Executive Highlights

On the third and last day of the GTC Bio 2014 Diabetes Summit, we had the pleasure of hearing from a number of leaders in academia, biotech, and big pharma in an intimate setting. Though Friday consisted of a shorter, half-day schedule, it yielded several valuable updates on clinical data and device development, as well as insights from industry giants during the afternoon panel session. A highlight of the day was the presentation of exciting early clinical data on MannKind's inhalable GLP-1. MannKind's VP of Pharmaceutical Development Dr. Andrea Leone-Bay highlighted the candidate's very rapid in-out profile, positive effects on glycemic control, and much less nausea than injectable GLP-1 agonists. MannKind is also looking into inhalable oxyntomodulin and PYY for obesity. The presentation was an excellent reminder that, although all eyes have been on Afrezza, MannKind's Technosphere inhalation system has potential for a number of different peptides. Looking to the commercial opportunity for non-invasive GLP-1 agonists, Heptares President Mr. Daniel Grau shared that payers have told Heptares that they will not be willing to pay more for Heptares' oral GLP-1 (which we believe is still in early-stage development) than they are paying for Novo Nordisk's Victoza (liraglutide). Mr. William Morgan (Executive Director, AstraZeneca) more broadly affirmed the notion that payers are becoming increasingly unwilling to pay more for a next-generation drug, than they paid for the current option when it first became available.

Friday also featured a number of presentations on the health of diabetes pharmaceutical industry from the perspectives of industry partnerships and biotech funding. Mr. Taskin Ahmed (IMS Health, Parsippany-Troy Hills, NJ) discussed the "robust" nature of partnering agreements in the diabetes field. IMS' data suggests that the most prolific deal-makers in the field are those that also lead in diabetes sales (i.e., Novo Nordisk, Sanofi, Merck, and Lilly). Notably, over 70% of partnering deals have been for products in discovery, suggesting to Mr. Ahmed, that the lack of opportunities to partner or acquire late stage candidates is forcing pharmaceutical companies to license products in earlier stages of development than they have in the past. Though this finding might be concerning on its own, we found it especially alarming due to a subsequent presentation by Mr. Grau on the weakening of the diabetes biotech field. In an informal and small analysis of current biotech players and their funding, Mr. Grau found investment trends suggestive of an outflow from diabetes: from 2012 to February 14, none of the 62 drug company IPOs were for a firm working in diabetes or obesity. If big pharma is relying on biotech for innovative, early stage candidates, than it appears this sector will need to play a larger role funding these companies. Indeed, Dr. Barry Ticho (Head, Cardiovascular and Metabolic Disorders, External R&D Innovation, Worldwide R&D, Pfizer) described there is a "death valley" of funding for early stage diabetes candidates, due to the large exits of venture capital funding from the area. The FDA's 2008 CV Guidance was cited as a key reason for the weakening state of the diabetes biotech field, countering Dr. Steve Nissen's (Cleveland Clinic, Cleveland, OH) suggestion, from the previous day, that the 2008 CV Guidance for type 2 diabetes drugs is not hampering innovation in diabetes drug development.

Regulatory uncertainty was also cited as a key obstacle for investment in the obesity field. While Dr. Steven Smith (Florida Hospital Research Services, Orlando, FL) encouraged drug developers to consider working on anti-obesity agents; industry leaders at the meeting shared that the regulatory uncertainty with that indication is preventing them from doing so.

Included below are our top ten highlights from the day, along with several honorable mentions.

Table of Contents

Top Ten Highlights

1. MannKind's Dr. Andrea Leone-Bay shared preclinical and early clinical data on an inhalable GLP-1 compound. This data served as a reminder that although MannKind's focus has been on its ultra-rapid-acting inhalable insulin Afrezza, it can deliver a range of peptides through its Technosphere powder inhalation system (the company is also testing inhalable oxyntomodulin and PYY for obesity). As opposed to the injectable GLP-1 agonist field, a field that is trending towards longer-acting once-daily and once-weekly candidates, MannKind's inhalable GLP-1 (the native human hormone) is absorbed and out of the system remarkably quickly. A study in healthy volunteers found that GLP-1 levels peaked within five minutes, the resultant insulin secretion peaked within ten minutes (confirmed by C-peptide readings), and glucose lowering peaked at ~30 minutes post-inhalation. The effects were fairly short lasting, due to GLP-1's short plasma half-life. Dr. Leone-Bay emphasized that GLP-1 inhalation produced many of the pharmacological effects of GLP-1 agonist administration (including better fasting and postprandial glycemic control), but with a much lower incidence of nausea and less of an effect on gastric motility, a likely effect of the quick-in, quick-out PK/PD profile.

- **There are some key differences between inhaled GLP-1 and injectable GLP-1 agonists in terms of therapeutic relevance.** Some of these stem from the differences between native GLP-1 (the hormone) and GLP-1 agonists (which activate the GLP-1 receptor). Data collected during the early clinical trial demonstrated that inhaled GLP-1 did not have much of an effect on gastric motility. Dr. Leone-Bay suggested that inhaled GLP-1 and the GLP-1 agonist exenatide (which was used as an injectable comparator in the study) lower glucose through slightly different mechanisms. A key factor will be whether inhaled GLP-1 will be associated with a comparably low risk of hypoglycemia relative to GLP-1 agonists. If they are, then we imagine it could be an even more attractive option for type 2 diabetes patients than Afrezza. The bigger question is how inhalable GLP-1 will compare on the composite profile to longer-acting injectable GLP-1 agonists - the need to presumably take it at meals is a downside, though the potential for reduced nausea and the avoidance of an injection offers lots of upside in a field that we believe will continue to expand.

2. Mr. Daniel Grau (Welwyn Garden City, UK) shared his understanding that US payers will be unwilling to pay a premium over inject GLP-1 agonists for an oral GLP-1, an impression affirmed by other panelists. Heptares is currently developing an oral GLP-1, and has been surveying payers to understand what its reimbursement positioning will be. Mr. Grau stated that the overall message Heptares has received from these conversations is "don't expect to charge more than Victoza for an oral GLP-1." Mr. William Morgan (Executive Director, AstraZeneca) expanded on this with an anecdote of presentation a senior person at NICE made at AZ about a month ago: the man from NICE asked AZ attendees how many had bought an iPad in the past year; a "bunch" of hands went up. He then asked, "Did it have additional features than the last version?" which it of course did. His follow-up question was "How much did you pay for it?," the answer being the same amount people paid for the old version of the iPad two or three years ago. Mr. Morgan explained that payers are expecting a similar payment scheme for drugs - new generations might have better efficacy/safety profiles, but payers want to pay the same amount for them as they did for current models when they were the latest innovation. We think one key difference between a better iPad and a better GLP-1, however, is that, most likely, it costs a lot more and takes a lot longer to make a slight improvement to a GLP-1 (or any drug) than to a technological device (assuming the device is not being used for medical purposes). For example, Apple does not have to enroll thousands of people into a trial of a new iPad or have to worry about whether it will get approved by a regulatory agency.

- **Heptares is developing a number of therapeutic G protein-coupled receptors (GPCRS) for the treatment of diabetes, including but not limited to an oral GLP-1, GPR40, GPR120, and GPR39.** It is our understanding that these candidates are still early stage.

3. Mr. Taskin Ahmed (IMS Health, Parsippany-Troy Hills, NJ) presented data on how, in the diabetes field, merger and acquisition (M&A) deals have declined over the last five years, while

the number of partnering agreements has remained "robust." Digging into the data from 2009 to 2013, Mr. Ahmed found that companies leading in diabetes sales are also the most prolific deal-makers in diabetes - Novo Nordisk, Sanofi, Merck, and Lilly are leading in both their annual sales in diabetes and the number of partnerships they have made in this area (details below). Over 70% of partnering deals have been for products in discovery, suggesting to Mr. Ahmed, that the lack of opportunities to partner or acquire late stage candidates is forcing pharmaceutical companies to license products in earlier stages of development than they have in the past. In line with this, Mr. Ahmed sees big pharma working with academia and research institutions to identify new therapeutic targets - a finding that corroborated what Ms. Lita Nelsen (Director, Technology Licensing Office, MIT, Cambridge, MA) concluded in a panel on industry-academia partnerships during GTC Bio Day #2. In particular, IMS Health's data suggests that pharmaceutical companies are seeking therapies in the long-term management of type 1 diabetes and the treatment of diabetes complications. For example, in 2013, the Joslin Diabetes Center partnered with Merck and Lilly to develop treatments for kidney failures as a result of type 2 diabetes.

- **Additionally, Mr. Ahmed found that the top five companies in the diabetes market have ~75% of global sales in the field.** Additionally, the top ten companies in diabetes earn $35 billion in annual global sales on their diabetes products.

Company	Total diabetes sales in 2009-2013 (millions)	Number of partnering deals in diabetes in 2009-2013
Novo Nordisk	~$50,000	5
Sanofi	~$40,000	10
Merck	~$25,000	8
Lilly	~$22,500	7
BMS	~$9,000	3

- **Looking at companies' diabetes pipelines, the IMS data Mr. Ahmed presented suggested that Lilly has a particularly large late-stage diabetes pipeline.** According to Mr. Ahmed's slides, the IMS defines early stage as discovery/preclinical, mid stage as phase 2, and late stage as phase three and pre-registration. His slide does not indicate how phase 1 is classified. Mr. Ahmed did not indicate when this data was recorded, and it does not account for BMS' exit from diabetes.

	Drugs in Pipeline by Development Stage		
Company	Late Stage	Mid Stage	Early Stage
Lilly	6	2	3
Novo Nordisk	3	3	1
BMS	1	2	3
Merck	3	1	1
BI	3	1	1
Pfizer	1	2	1
Sanofi	1	1	2
AZ	2	0	0

Takeda	0	0	1
Novartis	0	1	0
Daiichi Sankyo	0	0	1

4. Mr. Joseph Suarez (Arisaph Pharmaceuticals, Boston, MA) and big pharma leaders provided a strong counterpoint to Dr. Steve Nissen's (Cleveland Clinic, Cleveland, OH) suggestion, from the previous day, that the 2008 CV Guidance for type 2 diabetes drugs is not hampering innovation in diabetes drug development. Slightly before the guidance was formally released, a time when it was clear that there would be new requirements for type 2 diabetes drug development, Mr. Suarez's group was tasked with choosing to advance either a DPP-4 inhibitor or a cardiovascular drug. The timing and strength of the data were similar for both candidates, but according to Mr. Suarez, the decision to go with the cardiovascular candidate was clear due to the challenges and uncertainty involved in getting a diabetes drug to market. We believe this example illustrates a broader trend occurring within pharma companies. Indeed, the rest of the panel (comprised of leaders at Lilly, Pfizer, and AZ) acknowledged this constraining nature that the CV guidance can have on portfolio development, particularly for smaller biotech companies. For example, Dr. Barry Ticho (Head, Cardiovascular and Metabolic Disorders, External R&D Innovation, Worldwide R&D, Pfizer) described there is a "death valley" of funding for early stage diabetes candidates, due to the large exist of venture capital funding from the area (driven away, in part, due to the high-risk and high-cost nature of developing a diabetes drug). As a result, Dr. Ticho indicated that big pharma is needing to provide the funding and support to make sure promising drugs make the transition from the lab to the clinic. Although the size of the type 2 diabetes patient population will always mean that there are opportunities for drugs in the space, pharmaceutical companies only have so many resources to invest, and the regulatory challenges (including the CV guidance) mean that diabetes drug candidates become relatively less attractive options.

5. Mr. Grau presented trends he uncovered in small (n=35 companies) and informal analysis of the biotech sector that, if true, are highly concerning for the future of innovation in the diabetes and fields. While current biotech players in the diabetes and obesity fields have a "healthy balance" of high risk/high innovation and low risk/low innovation candidates (details below), investment trends suggest an outflow from diabetes. From 2012 to February 14, 2014, 62 drug companies held an IPO - none were working in diabetes (since then Dance [which is developing an inhaled insulin] filed). Similarly, few companies working in metabolism (he did not have data down to diabetes so these numbers would overestimate financing in diabetes) have conducted Series A financing: in 2012, four held Series A financing; in 2011, none did; in 2010, five did; and from 2006 to 2009 none did (Mr. Grau emphasized how these were substantially lower numbers than for other medical areas like oncology). Mr. Grau hypothesized that the number of anti-diabetic agents already available on the market, the high cost of developing a diabetes drug (in large part due to the FDA's CV guidance) are key headwinds for more small companies working in diabetes. Mr. Grau and ourselves fear that the long-term impact of this reduced investment and innovation will result in fewer breakthrough drugs for people with diabetes, which has a great cost both in terms of quality life and the nation's finances (more people with complications due to poor glycemic control). On the flip side, Mr. Grau noted that the scarcity of biotechs in diabetes heightens the opportunity for the "contrarians" in the field - earlier and better deals are being made by big pharma due to the dwindling supply of licensing opportunities.

- **Mr. Grau characterized current biotech players in diabetes and obesity as having a "healthy balance" of risky-innovative plays and more validated-incremental plays.** By his categorization (which he acknowledged is subjective and debatable), 31% are pursuing a novel substance whose target is also new (e.g., Andromeda/Hyperion's DiaPep277 for type 1 diabetes), 29% of biotechs are pursuing a candidate that is a proven substance and who's target is validated (i.e., old drug in a new formulation; e.g., noninvasive insulin), 29% are working on a novel substance who's target is validated (e.g., next-generation SGLT-2 or DPP-4 inhibitor), and 11% are working on

a proven substance who's target is new (i.e., repurposing an old drug; e.g., bupropion/naltrexone [originally used for psychiatric/behavior purposes now being developed for obesity]).

6. Dr. Steven Smith (Florida Hospital Research Services, Orlando, FL) and industry leaders discussed what it will take for an obesity pharmacotherapy to be successful, and why more are not in development. Dr. Smith urged drug development leaders to consider obesity as a key target for pharmacotherapy intervention. Dr. Smith anticipates that weight management will increasingly become an integral part of diabetes interventions. His sentiment was reaffirmed in the afternoon industry panel where many of industry's biggest players including Pfizer, Lilly, and Merck cited weight loss as one of the most important and desired "plus" components for a "glucose +" product (i.e. a drug that lower glucose, plus additional benefits; SGLT-2 inhibitors were commonly cited as an example). Dr.. James Tobin (VP Cardiovascular and Metabolism Scientific Innovation, J&J Innovation Center, Boston, MA) in the panel audience even commented, "If you put your thumb on anything, it's obesity. It is a disease driver. If the obesity stigma didn't exist, I would expect there would be many more mechanisms addressing this area." When asked why more companies are not developing obesity+ drugs (i.e., an anti-obesity agent that has other benefits like improved glycemic control), industry panelists cited the regulatory uncertainty that exists for anti-obesity drugs. Indeed, Vivus, Arena, and Orexigen all initially received complete response letters from the FDA for their candidates (Qsymia, Belviq, and Contrave). However, the situation seems to have improved at least slightly in the US since Congress instructed the FDA to work on getting more obesity treatments to the market. Under this political pressure, the FDA approved Qsymia and Belviq, and we hope it will do the same for Contrave this summer. The regulatory environment on the obesity front remains bleaker in Europe where the EMA turned down Qsymia and Belviq, indicating that they will require a pre-approval CVOT for at least Qsymia.

- **In order for future obesity therapies to be effective, Dr. Smith emphasized that developers must consider a drug's** i) efficacy (some industry panelists noted that currently available options to not generate the >10% weight loss they want to see), ii) safety/tolerability, iii) durability (people on Belviq and to a lesser extent Qsymia regain weight during their second year on the drug), iv) effect on comorbidities, v) cost-effectiveness, and vi) ability to prevent other disease.

7. Dr. Howard Wolpert (Harvard Medical School, Boston, MA) reviewed challenges in the adoption of diabetes technology, highlighting that the widest gap remaining is translating successful products into the hands of patients who can use them effectively and continuously. In order for such translation to happen then, "it is no longer enough to just do efficacy and cost-effectiveness trials" - though often overlooked, widespread payer coverage of devices (specifically CGMs) will be key in bridging the gap. Similar to what we heard from Dr. Timothy Bailey (AMCR Institute, Escondido, CA) at this year's Clinical Diabetes Technology Meeting, Dr. Wolpert highlighted that the wealth of information and data that diabetes technology provides is useless unless it leads to a change in self-care behavior. Dr. Wolpert also emphasized that patient misperceptions about new diabetes technology (i.e., that they are "magic bullets") can often lead to burnout and non-adherence. It's key for patients to remember that "there is no vacation from having to take care of your diabetes." His key strategies for sustained adherence included thorough device education, goal setting, and most importantly, a patient support infrastructure. Dr. Wolpert cited Dr. Marilyn Ritholz's (Joslin Diabetes Center, Boston MA; who we also heard at CDTM) 2014 study that identified the value of spousal involvement in patients' successful use of CGM and sustained adherence. Targeting this meeting's audience, Dr. Wolpert also highlighted additional unmet needs that technology developers can focus on, particularly in device design that can support patient education and adherence - we believe there is much to be done on this front so that patients feel successful using technology, especially CGM. Emphatically, he ended by saying that great device infrastructure "is more than just button pushing, but provides patients and providers with the tools for data analysis and decision support to sustain long-term patient engagement in self-care."

8. Dr. James Tobin (VP Cardiovascular and Metabolism Scientific Innovation, J&J Innovation Center, Boston, MA) shared some insight on the early stage research areas J&J is focused on within diabetes. J&J is thinking about pursuing indications of obesity and/or of type 1 diabetes for Invokana (canagliflozin). Looking earlier in J&J's pipeline, Dr. Tobin stated that J&J is working on rescuing

the beta cell in type 2 diabetes. He cited Dr. Domenico Accili's (Columbia University, New York City, NY) hypothesis that beta cell failure in type 2 diabetes is driven by dedifferentiation of the beta cell, not apoptosis - we heard Dr. Accili speak on Wednesday at the GNF-JDRF Diabetes Research Symposium. Based on this idea, J&J is developing candidates that can reverse this beta cell dedifferentiation. Notably, Dr. Tobin confirmed that J&J did acquire Dr. Doug Melton's betatrophin (shown to stimulate dramatic beta cell regeneration in rodents), which J&J thinks could cause this action. Additionally, J&J is interested in preventing the progression of diabetes, and thinks that BetaLogics' work on stem cells could achieve this. As background, BetaLogics is focused on using stem cells to create pancreatic islet cells. These islet cells are contained in a device that is subcutaneously implanted with the hope of normalizing glucose levels. J&J hopes to move this approach into the clinic in 2015 (for more details on BetaLogics see our GTC Bio 2013 Day #1 report here). Lastly, J&J is collaborating with NGM pharmaceuticals on preclinical factors that potentially mimic the glucoregualtory effects of bariatric surgery, including the reversal of insulin resistance.

9. Dr. Tobin argued that big pharma needs to stop "fishing" for innovative drugs and start "farming" them. By this, Dr. Tobin meant that the old model of big pharma scouting and acquiring late stage candidates is increasingly ineffective. Instead, he thinks pharma should foster and support work on early stage agents. J&J is doing this through the four innovation centers it launched in 2013, which are located in London, California, Boston, and Shanghai. Similar to a Venture Capital firm (VC), each center is able to execute a deal, the vast majority of which have been leveraged with other investors. However, unlike a VC, J&J sees its "exit" being the internalization of a derisked agent, rather than a straight financial gain. To help an candidate develop, the innovation center can then provide R&D support, in-kind technological support, access to J&J experts, incubator space, access to vendors.

10. Dr. Brian Bloomquist (Senior Director, Global External R&D, Lilly) complemented Hyperion's acquisition of Andromeda (and with it Andromeda's phase 3 approach for treating type 1 diabetes, DiaPep277) as being "nice back-loaded." By this, Dr. Bloomquist was highlighting the deal's use of many regulatory and commercial milestones, and a relatively low upfront payment. Acquiring companies, of course, appreciate that such an arrangement lowers their fiscal risk if a risky approach does not make it to the market or does not have the expected commercial uptake. For background, if the deal closes as expected, Hyperion will pay $12.5 million in cash (minus adjustments for expenses Hyperion incurred with the transaction), and 312,869 shares of Hyperion common stock (valued at ~$7.85 million). Later payments Hyperion might make Andromeda security holders pending success include i) up to $120 million worth of global regulatory and approval milestone payments, ii) up to $430 million in commercial milestones, and iii) tiered continent sales payments ranging from 10% to 17% (with the exception of sales by distributors in certain undisclosed territories for which the rate is 25%).

Honorable Mentions

In an interesting presentation, Mr. Bruce Redding (President and CEO, Transdermal Specialties) introduced the U-Strip Trans-Insulin Patch. This non-invasive, transdermal system delivers insulin directly to the skin via alternating ultrasonic transmission (more background below). In the picture of the device, an OmniPod-sized on-body patch connects to a handheld controller. The recently completed HPT-6A clinical trial (n=5 with prediabetes) tested the U-Strip device over eight hours with lispro insulin (a new patch was used every four hours). The device apparently brought most participants in range (85-115 mg/dl) in less than 35 minutes, but we'd note that "most" was not quantified and the data tables did not share information to support this claim. In addition, some of the notations made us question the study's rigor ("had soda at start" and "had super meal"). The U-Strip reportedly saw 88% bio-absorption (compared to the median range of 15-22% for injectors), though the specific parameter at hand was not quantified. Despite a series of bold claims, the study data was not presented in a fashion that allows for any sort of meaningful comparison to current or next-gen rapid-acting insulins (e.g., "glucose drop over eight hours"). Mr. Redding said that the device has been tested in over 200 patients and "we haven't failed yet." Due to the preclinical success of the device, the company is working to develop the system for use in the hospital and emergency setting. Mr. Redding and his team were extremely enthusiastic about their system, describing it as "truly novel" and "disruptive" in the field of insulin delivery. We believe there is a lot for the company to prove at this stage, but a transdermal insulin system does have potential and certainly warrants further research.

- **The HPT-6B trial on additional type 2 patients will begin in late June 2014 at Wake Research.** The study will use the miniature U-strip device and low-profile trans-insulin patch. The company plans to conduct a final 500-patient trial in the US, anticipated for 2015, after which the device will be submitted for FDA approval.
- **For background on the system's operation, the ultrasound transmission dilates the pores, allowing large molecule drugs like insulin to penetrate sweat pores and then move into the bloodstream.** The accompanying SA (Sonic Applicator) Control Unit (directly attached to patch when worn on arm or connected through a wire lead to the transducer coupler when worn on the hip) allows patients to program both basal and bolus insulin delivery and can be set to deliver doses every hour for a basal program, and to meet mealtime bolus scheduling.

Dr. Ralph DeFronzo (University of Texas Health Science Center, San Antonio, TX) gave a familiar (to us, though likely not to most attendees) presentation on the need to treat the underlying pathophysiology of type 2 diabetes through combination therapy - see our CODHy Latin America 2014 Report for a talk he gave on a similar subject. Dr. DeFronzo reiterated a number of points from those previous talks, namely his huge enthusiasm for SGLT-2 inhibitors. Here, and at CODHy, Dr. DeFronzo shared that if he conducted his triple therapy study today, he would switch metformin out for an SGLT-2 inhibitor. During Q&A, he also characterized oral GLP-1 agonists as a major potential opportunity for diabetes care in terms of quality of life (for patients), ease of prescribing (for providers), and unlocking the real growth potential of the GLP-1 agonist class. Dr. DeFronzo earned the rapt attention of nearly the entire GTC Bio Diabetes Summit, but this was still one of the more intimate settings in which we have seen him speak (total diabetes track attendance was around 40).

Dr. Oren Hershkovitz of Prolor Biotech (which was acquired last year by OKPO Health) presented preclinical data on MOD-6031, the company's long-acting oxyntomodulin (GLP-1/glucagon co-agonist). The candidate is designed using a reversible form of pegylation: instead of permanently binding the functional peptide to a PEG group (which can cause problems with steric hindrance and specificity), MOD-6031 is connected to a PEG group using a hydrolysable linker, which slowly dissociates over time. Prolor Biotech believes that once-weekly dosing would be an option with MOD-6031, a valuable differentiating factor for the company given that a few other GLP-1/glucagon co-agonists are being developed (Lilly/Transition Therapeutics' phase 2 TT401 and Lilly's phase 1 oxyntomodulin). The preclinical results demonstrated improvements in weight, glucose, insulin release, and cholesterol profiles relative to native oxyntomodulin and permanently PEGylated oxyntomodulin, and with less frequent injections. The company plans for a pre-IND meeting in 3Q14, and to start a phase 1 trial early next year.

Mr. John Brooks (President and CEO, Joslin Diabetes Center, Boston, MA) described how the Joslin Diabetes Center is "not your grandfather's academic medial center anymore." For example, Joslin is diversifying where it receives research grants from such that it is not dependent upon the NIH in the likely case that its budget is further reduced. One way that Joslin is doing this is by working with industry partners on outcomes research, and the regulatory and reimbursement processes. Joslin does this by helping companies determine the value proposition of a new agent and where it might fit in the healthcare field and diabetes treatment scheme. Additionally, Joslin is working with self-insured employers to create apps that enable members to participate in a weight management program, similar to the one Joslin runs in its center, without having to make the trek to Boston. Turning to basic research, Joslin has been studying their Medalists (people who have had diabetes for 50 years of more - one has had diabetes for over 80 years) to try and determine what factors have made them successful in their diabetes management. Mr. Brooks stated that Joslin has found several "interesting protective proteins" and that rights these agents are being moved to a start-up company for further development.

-- by Jenny Tan, Hannah Deming, Manu Venkat, and Kelly Close