

# TRIGR Family News

## Editor's corner

Pleasant Christmas time to all of YOU, dear Families! The TRIGR National Investigator from Sweden, Professor Johnny Ludvigsson tells us with his long impressive record in medical science, how important our common interest, the TRIGR-project, is. Its significance is immense. **Thank You for being with us!**

Matti Koski  
Chief Editor

## The fight against the Diabetes

A young woman with diabetes coma. Very dangerous! I can still feel how I, as a young doctor on duty in the 1960's, was so afraid that the patient should die. She survived. Diabetes coma was life-threatening and still, many decades later, diabetes coma can lead to death, in spite of modern technique, modern intensive care, modern insulin, sensors, pumps, computers. The best treatment of diabetes coma is prevention. The same is true for the disease itself, diabetes.



### Diabetes should be prevented!

Yes, there are worse conditions, and patients with Type 1 diabetes may have a very good life. But not at all normal, as it is not all normal to take several injections every day, measure blood glucose frequently and sometimes ketone bodies and eat at regular times, and to think of what the meal consists of, amount, carbohydrates, fibres... Life with Type 1 diabetes can be long, exciting, happy, fantastic as lives can be. However, some individuals may suffer from acute complications because of low blood glucose (hypoglycemia) or high glucose (hyperglycemia), and

this may cause even severe damage of their organs, so called late complications, which leads to failure of several organs such as kidneys, heart, nerves and eyes.

### Can we prevent if diabetes is a genetic disease?

If diabetes would be due just to genetic factors, we would need some genetic manipulation to prevent the disease. But as far as we understand, diabetes is NOT the result of one or a few changes of genes.

Genetic factors play a role for all diseases. In some families *allergy* is common, and it is evident that there is a genetic predisposition, even though environmental exposure play a role, too. In other families most members are *obese*. To become obese it is necessary that a person consumes more energy than is needed. Thus too much energy from food and/or beverages leads to obesity. But still genetic factors play an important role. Some people eat a lot but do not absorb all calories. Others have a tendency to move their body a lot, and spend very much energy. Such traits depend on genetic traits as well as environment. The background to *diabetes* is certainly genetic. This seems especially true for Type 2 diabetes, related to poor effect of insulin and to increased need for insulin because of obesity, low physical activity etc. But it is also true for Type 1 diabetes. Genes play a role for the number and function of the insulin-producing cells and for how the immune system reacts. Why some people easier than others develop a "civil war", that is to direct their immune cells (defence system; army) against their own organs. But once again, genes play only some role, but this is not enough. Thus we know that Type 1 diabetes depends on environment and life style. Individuals who move to areas where Type 1 diabetes is more common, establish an increased risk. And the disease becomes more and more common, much more rapidly than the genes can change.

### What environmental factors, in addition to genes, cause Type 1 diabetes?

Nobody knows what causes a failure of the fuel supply to the organs which leads to a stop of the engine, unless fuel supply is kept going by artificial injections of insulin. There are speculations, some of them supported by findings.

*Infections:* Already in 1927 a Swede wrote in a scientific journal: "Is diabetes an infectious disease?" He had noticed that some children got diabetes after they have had mumps! Very clever observation! He was right. In sporadic cases mumps may cause damage

to the pancreas followed by diabetes. But this is or was a rare cause. Vaccination against mumps did not eradicate Type 1 diabetes, but on the contrary the disease has continuously become more and more common. Diabetes has been noticed after several other infections, and many of us believe that infections play an important role. Perhaps they start a "civil war" (autoimmune reaction) in the body, that leads the immune system to attack by mistake cells in the own body. And/or infections play another role, as the war against these enemies requires extra energy, and to get extra energy to the organs we need more insulin, and in individuals who cannot increase their production of insulin that may lead to relative lack of insulin, blood glucose increases...diabetes. Rarely (?) or sometimes (?) patients with infections pass this crisis with hours or days of "diabetes" and are thereafter able to produce enough insulin again. But some patients develop permanent diabetes.

*Toxic agents:* In experimental animals we know how to provoke an autoimmune reaction leading to the death of the insulin-producing cells. Similar toxic agents exist in society, and one could imagine that we sometimes consume such agents. There have also been suggestions that certain nitrites/nitrates could be dangerous, but this has not been confirmed. Nothing has been proven suggesting that modern substances e.g. conservatives, colours etc added to food would play any role in the development of diabetes.

*Sugar:* Sugar certainly stimulates the insulin-producing beta cells. If we eat a lot of sugar it forces the beta cells to work harder, to produce insulin rapidly. Nobody has been able to show that the single individual who gets diabetes consumes more sugar than other people, but increased stimulation of the beta cells causes not only secretion of insulin and C-peptide but also other substances such as enzymes like tyrosine phosphatase, glutamic acid decarboxylase etc. In an individual where the immune system for other reasons is unstable, it MIGHT be so that these substances (antigens) released, could result in an abnormal reaction of the immune system, and an autoimmune process starts. This does not require that the single individual who gets diabetes eats more sweets or drinks more sweet beverages than others, but if many children increase their stimulation/stress of beta cells, it may increase the risk that some persons will develop an autoimmune process.

*Low Physical activity and stress:* Physical activity increases the body's sensitivity to insulin, implying that insulin gets more effective. Low physical activity increases the load on the insulin-producing cells in the same way as increased sugar/energy consumption. The same is true with stress, any stress including stress because of infections, trauma or psychological trauma/ stress. All these factors, normally associated with the development of Type 2 diabetes, could perhaps contribute to Type 1 diabetes in individuals who happen to be predisposed to an autoimmune type of reaction.

*Hygiene:* Increased hygiene in itself can hardly cause damage to the beta cells, but our immune system, the defence system, is built to defend us against enemies like bacteria, viruses, worms etc. IF the hygiene is so good that we meet few such enemies, one can speculate that the strong "army" could suddenly be used against the own tissue, if something initiated such a reaction. Such precipitating factors could then be an infection or certain factors in the food.

*Food:* It is natural to ask whether certain factors in the food could cause the immune process. All new substances which a child meets in early life, are to be regarded as possible enemies by the immune system. There are then certain proteins which are introduced very early in life, which might cause such reactions or mistakes by the immune system. In western culture cow's milk proteins are a normal component in various foods, not only in infant formula, but in sausages, meals prepared for small children, cheese, etc. Another type of common protein is gluten from wheat, which we know can cause inflammation in the gut in certain people. Studies in animals, and several epidemiological associations have lead to the hypothesis that early introduction of e.g. milk proteins may cause a disturbed immune reaction which in some children turns into a chronic autoimmune process. That is the background to our trial, TRIGR, where we are studying whether avoidance of early exposure to cow's milk proteins decreases the risk of diabetes.

### **But how do we prove what is the cause?**

Individual people believe in different ideas because they have a special experience. Somebody may believe that you can prevent diabetes by adding a certain vitamin e.g. vitamin D which has been discussed quite a lot in recent years, but without strong evidence, or avoiding a certain substances, e.g. heavy metals when teeth are repaired. However, there is no other chance to prove what is true or not than through well planned studies. During my first decades as a physician I worked even more with cancer in children than with diabetes. In the early 70's most children with cancer died. It was terrible! But rather soon the prognosis improved dramatically. Not only because new drugs were discovered, but because every child with cancer took part in trials, where new combinations of drugs were tested, and the results became better and better. Within 10-15 years 75-80% of all cancers became curable, and certain forms of deadly cancer were cured in 100% of the cases! Fantastic! How do we reach those results in diabetes? By studies! It is necessary that children with diabetes as a routine participate in studies. Then we do not need decades and more decades, but we can rather soon show how to improve treatment to save beta cells. The same is true for prevention of diabetes. Every child with increased risk of getting diabetes should if possible take part in trials such as the TRIGR trial. If children do participate and do not drop out making it impossible to draw firm conclusions regarding the outcome, then we will learn! TRIGR will show whether it helps to avoid cow's milk proteins during the first 8 months of life.

## Together we will win

We hope for good results of the TRIGR trial, but it is not realistic to believe that avoidance of cow's milk early in life will prevent all Type 1 diabetes. We will most probably need more studies even if the result is very positive, and we prevent several cases of diabetes. And when people/society understands that they MUST generously support such studies, to make them feasible, as has happened in cancer research, then diabetes will also be prevented and cured. Together we will win!



*Johnny Ludvigsson  
Professor of Pediatrics,  
Linköping University, Sweden  
Participating in TRIGR since the very first pilot studies  
20 years ago*

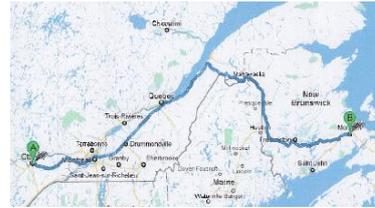
## TRIGR in Canada

Katie Marie Booth is the oldest participant in the TRIGR study in Canada. She was born in June 2002 and was followed by the TRIGR Centre at the Children's Hospital of Eastern Ontario, Ottawa Canada. In June 2010 her family moved to Moncton, New Brunswick approximately 1,180 km away. The drive took them through the Provinces of Ontario, Quebec and New Brunswick. The family wished to continue in the TRIGR study so they were given the choice of two TRIGR Centres; one in New Brunswick and the other in Nova Scotia. The family chose the IWK Health Centre, Halifax, Nova Scotia site and in the spring of 2011 they had their first study visit with the coordinator. The trip to Halifax is approximately 260 km each way! The family chose this location as they have family in the Halifax area and can stay with them if necessary. Katie's younger brother and sister also participated in the TrialNet Natural History Study when they visited the coordinator Karen in Halifax.

Katie is very proud to be in the study and wears her 6 Year OGTT TRIGR T-shirt proudly. She was very impressed with the IWK Health Centre in Halifax especially their train display. She loves the fact that her brother Kevin and sister Rebecca are now part of the TrialNet Study. Mom says that they received a warm welcome at the IWK and can't wait to go there again next June.



As with many other countries, families in Canada are often on the move. Having 18 TRIGR Centres across our country makes it easy for families to relocate, transfer to another TRIGR Centre and still continue in the study.



*Ottawa ON to Moncton NB  
1,180 km – about 14 hrs*



*Moncton NB to Halifax NS  
260 km – about 3 hrs*

In June 2011, the Investigator Dr. Girgis from the TRIGR Site in Edmonton, Alberta's Stollery Children's Hospital was on vacation in Spain when she took a little side trip to visit one of their TRIGR families living in San Luis de Sabinillas. With the help of the TRIGR members in Edmonton Canada, Madrid Spain and Helsinki Finland she was able to do the blood draw for this child and send the samples directly to the TRIGR lab in Helsinki. This was quite an experience for Dr. Girgis but we are all very appreciative of her efforts. It is nice to see how TRIGR International can work together so that study visits can still go on no matter where our families live.

*The article was written out by Canadian Study Coordinator  
Brenda Bradley*

## Tips to eat more healthy by using more fruits and vegetables

Fruit and vegetables are an important source of vitamins, minerals and dietary fibre. Good intakes of these can help children grow and develop and help prevent a range of diseases such as Type 2 Diabetes, heart disease, high blood pressure and some forms of cancer. The Australian National Nutrition Survey (1995) identified that approximately one third of children 4-11 years had not eaten fruit or fruit products and that 20% of children under 12 had not eaten vegetables or vegetable products the day prior to the interview. A local study in the Hunter revealed that 58% of children do not consume the recommended serves of vegetables.



*Homegrown baby carrots might not always look the same, but still taste good*

When discussing children's diets (and sometimes adults), fruit and vegetables appear to be one of the main areas that parents struggle with. In New South Wales a fruit and vegetable campaign has commenced recommending on a daily basis children 4-7 years eat 1-2 serves fruit and 2-4 serves vegetables, and children 8-11 years eat 1-2 serves fruit and 3-5 serves vegetables – "Go for 2 & 5". Another strategy has been incorporating a crunch and sip where the child has a fruit or vege serve and water break at school to ensure that school children will receive 1 piece of fruit or veg per day. Other strategies for encouraging fruit and vegetable intake are:

1. Be a good role model, children are more likely to eat fruit and vegetables if other people about them do
2. Get children to assist with shopping and picking out fruit and vegetables for the family
3. Let children be hands on - Allow children to assist with food preparation
4. Try growing fruit and vegetables, children often enjoy watering and picking fresh fruit and vegetables and enjoy the taste when freshly picked
5. Try vegetables in a variety of methods - raw, microwaved, mashed, baked, stir fried, grated into a bolognese sauce or frittata, blended in soups, add to burrito's, pizza, fried rice.



*Wow, that's some zucchini*

6. Add sauces and gravies if required,
7. Add fruit to cereals, yoghurt, as a basis for desserts, make a fruit smoothie, fruit kebabs or freeze fruit for a great snack. Keep some fruit handy cut up in the refrigerator for ready access.
8. Use sticker/ star reward charts – some free ones can be found on <http://www.bubhub.com.au/rewardcharts.php>

9. Keep retrying, there is some evidence that children need to try foods up to ten times before they are liked or accepted.
10. Use positive reinforcement, if a child expresses a dislike, tell she/he that they should try again later and that when they are bigger like (choose a positive role model they admire that does eat fruit and veg) they might like it – this will encourage the child to retry and not lead them to expect that they will dislike it forever
11. If offering a choice, offer 2 different choices of the same food group eg rockmelon or banana – this way the child feels they have some choice whilst still having a fruit serve
12. Use fruit and vegetables in season or canned, dried or frozen to keep costs down

*Our Australian Study Dietician Denise Wong See sent these healthy greetings to us*

## Smile

### A Trip to Skylar's House

Off to Skylar's house we go  
 Blood drawing kit in tow  
 She lives on an island so far  
 We had to travel by plane and car

We put on the spray to ease the tears  
 My arms encircle to help the fears  
 Skylar is ready, lets get started please  
 Suddenly dad says "Smile and say cheese"



The needle goes in  
 Out comes the grin  
 We get hugs and smiles  
 This is why we travel so many miles



*USA Study Coordinator Margaret Franciscus on the job*