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SICK DAYS AND HELP LETTERS

Details

Written by Rebecca S. Wappner, M.D.

Published: 20 July 2009

We have not printed information on the need for medical letters for quite a few years. Dr. Rebecca S. Wappner is Professor and Section Director of Pediatric Metabolism and Genetics at Riley Hospital for Children in Indianapolis, Indiana. She kindly consented to write about the steps to take in times of sickness including the need for a medical (help) letter.

Sick Days
Everyone with a child who has a metabolic disorder needs to be prepared for those days when the child experiences the flu or a cold and changes need to be made in nutrient intake. With the increased fluid and caloric requirement associated with fever, children with metabolic disorders are at risk of having their disorder become uncontrolled. The best way to prevent this is to increase calories and fluids and reduce the amount of natural protein that is usually taken. Every patient should have a sick day plan and a sick day diet individualized for them by their metabolic staff.

The sick day diet should be started when the individual develops the flu, cold, or other illnesses which decrease appetite. The metabolic doctor should be contacted to see what other measures need to be taken. If you haven't received a return phone call from the metabolic clinic, and you know the sick day plan needs to start, do not hesitate to start it. (An extra batch of formula can always be discarded if not needed.)

For MSUD, the sick day diet is usually 110% to 150% of the usual amount of special medical food (supplement devoid of the branched-chain amino acids) plus additional isoleucine and valine. The isoleucine and valine are calculated at the usual daily dietary intake of the branched-chain amino acids (BCAAs) when milk, regular formula, and/or food is included. If any table foods are taken, they should contain minimal or no leucine so leucine intake is lowered to near zero. The goal is to keep the caloric intake high enough to prevent catabolism or breakdown of the body stores of protein. Urine DNPH testing should be done at least twice a day and a blood test taken to check the level of the BCAAs.

A relatively new drug, Zofran (ondansetron), is now available in a tablet/pill form, in addition to the previously available (expensive) IV form, and can be used to prevent vomiting, especially if the vomiting is related to a gastroenteritis (stomach flu). Phenergan can also be used, but may cause sleepiness. Kaopectate and Imodium-AD can be taken for diarrhea. Check with the doctor for appropriate doses for the age of the child. Also check about any other cold remedies or medications.

As the individual improves, go back to the usual daily formula, and slowly increase the leucine from natural foods over a few days. Be sure to continue to monitor urine DNPH during the time of increasing leucine intake in case a rebound occurs.

Help Letters

Despite early planning and starting sick day formulas, sometimes we are unable to stop an episode of metabolic decompensation - or, vomiting and/or diarrhea continue. It is **now** time to go to the hospital before things get worse. Every child with MSUD or an organic acidemia should have a "Help Letter" written by their clinic which the family carries with them at all times. This "Help Letter" should contain:

- Patient's name and date of birth.
- Diagnosis and a brief explanation of the diagnosis - short, clear, and just enough of the "scary" information to make the ER staff move into action. **Example:** MSUD is a disorder of BCAA metabolism that results in elevated blood levels of the BCAAs - leucine, isoleucine, and valine. Untreated the disorder can result in vomiting, abnormal neurologic findings, an odor of maple syrup (from abnormal BCAA metabolites), hypoglycemia, acidosis, hyperammonemia, lethargy, coma, and death. MSUD is treated with a special diet, low in leucine, using special medical foods and a limited amount of natural protein foods. Persons with MSUD are at risk for metabolic decompensation at times of decreased caloric intake, i.e., with flu, colds, fasting, or vomiting.
- Specific directions for the ER staff. **Example:** If *patient's name* presents to you for emergency care, it is most important that you see her/him immediately. Blood should be taken for a Dextrostix, electrolytes with CO_2 level, serum osmolality, and quantitative amino acids. Urine should be sent for urinalysis and osmolality. If she/he is symptomatic (vomiting, lethargic) do not wait for the results of the studies, but proceed with an IV with D5/W , normal saline and run it at a maintenance rate. Give 2 mEq/Kg sodium bicarbonate as a slow bolus over 20-30 minutes (dilute 1:1 with IV fluids). Watch carefully for signs of increased intracranial pressure; give Mannitol if pressure is present. If you call us when *patient's name* is in your ER, we would be most willing to assist you in her/his care and give additional instructions.
- Specific instructions for contacting the metabolic staff in charge of the patient. **Example:** We can be reached by calling *Clinic's number* during working hours, or by calling *emergency number* after hours and weekends, and asking for *name(s) of person(s)*.

Families should plan ahead when traveling in case an episode of metabolic decompensation occurs. Prior to a trip, you should:

- Make sure you have extra copies of the "Help Letter."

- Make sure you have supplies you might need if an episode of decompensation starts: Zofran tablets and Kaopectate, extra isoleucine and valine for MSUD, and a supply of IV L-carnitine and protein-free powder for organic acidemias.

Ask your metabolic clinic for a list of the children's hospitals and other metabolic staff along your route. You may even considering driving a certain way, just to be closer to a metabolic clinic in case you need help.

GENETICS PRIMER

Details

Written by Erik G. Puffenberger, Ph.D.

Published: 20 July 2009
Erik G. Puffenberger, Ph.D., Clinic for Special Children

The progress in gene repair therapy prompts a deeper interest in genetics for persons involved with MSUD. Dr. Erik Puffenberger, is the Asst. Laboratory Director/Geneticist at the Clinic for Special Children in Strasburg, Pennsylvania where the first trials in gene repair therapy are scheduled to take place. This article is reprinted with permission from the summer '99 issue of the Clinic for Special Children Newsletter.

We lay persons find it hard to understand genetics. Dr. Puffenberger uses the analogy of the chromosomes as a set of encyclopedias, making complicated genetics easier to understand. He lists the mutations that can currently be detected by tests for carrier status at the Clinic.

The human body is composed of approximately 75 trillion cells. Groups of similar cells in the body are organized into tissues and organs (e.g., liver or kidney) which have specific functions (e.g., digestion, respiration, and circulation). However, all cells, no matter what their function in the human body, contain the full complement of genetic material that we call DNA. DNA is a chemical component of every cell that acts as the blueprint for growth, development, and regulation of all aspects of body chemistry.

What is DNA?
Deoxyribonucleic acid (DNA) is the hereditary material of the human body. DNA is made up of four different chemical compounds, namely adenine (A), guanine (G), cytosine (C) and thymine (T). These four chemicals are linked together into a long string. Within each cell in the body, these strands of DNA exist in a very ordered fashion, namely as chromosomes.

What is a chromosome?
Each cell contains 46 very long strands of DNA that are called chromosomes. Both the egg

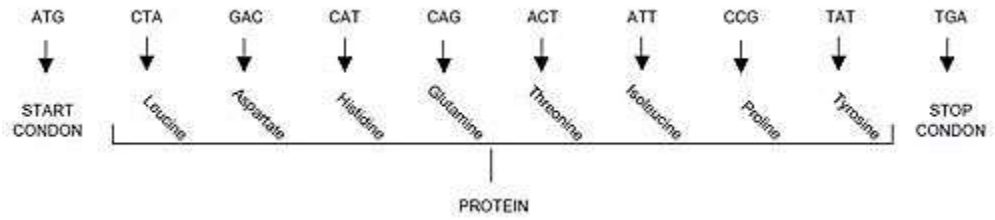
and sperm carry half the normal complement of chromosomes (i.e., 23). Once fertilization occurs, the new embryo contains a full set of chromosomes (46), half (23) derived from the father and half (23) from the mother. However, these chromosomes are not all different. The chromosome set inherited from the mother contains the same chromosomes as the set from the father. Thus, while each cell carries 46 chromosomes, there are two copies of each chromosome per cell. As an analogy, imagine the chromosomes as a "46-volume set of encyclopedias." The "complete set" is composed of two identical 23-volume sets. One 23-volume set is inherited from the father and the other [set] from the mother. Thus, there are two copies of volume 1, two copies of volume 2, etc.

What is a gene?
A gene is a discrete section of DNA which has a specific function. Each gene is encoded by a specific and unique portion of DNA on a chromosome. Genes are the blueprints for manufacturing the materials that the body requires in order to function properly. Every protein and enzyme found in the human body is produced from the instructions found within the genes. It is estimated that there are approximately 50,000 genes found on the human chromosomes.

Based upon the encyclopedia analogy, each page in the set of encyclopedias would carry the instructions for a single gene. Since there are two copies of each volume in the set of encyclopedias, then it follows that there are also two copies of every page (and thus, two copies of every gene). These encyclopedias, however, are not written with the usual 26-letter alphabet, but rather by a simpler four letter alphabet, corresponding to the four chemical compounds which make up DNA (A, G, C, and T). Thus, a page torn out of one of these books might read like this:
... ATGCTAGACCATCAGACTATTCCGTATTGA ...

How is the gene read?
The body has a very complex method for reading the gene letter sequence and converting it into a protein or enzyme. Proteins and enzymes are composed of a set of twenty different amino acids. Each protein has a unique sequence of amino acids bound together in a long string. But how does the text of the gene get converted into the amino acid string called a protein? All genes begin with the same three letters - ATG. From this initiator, the letters of the gene are read in sets of threes called codons. There are a total of 64 possible codons, each of which signifies a different amino acid. There are also three stop codons which signal the end of the gene - TAA, TAG, or TGA.

Using the short gene sequence from above, the figure below illustrates the method by which the DNA is read:

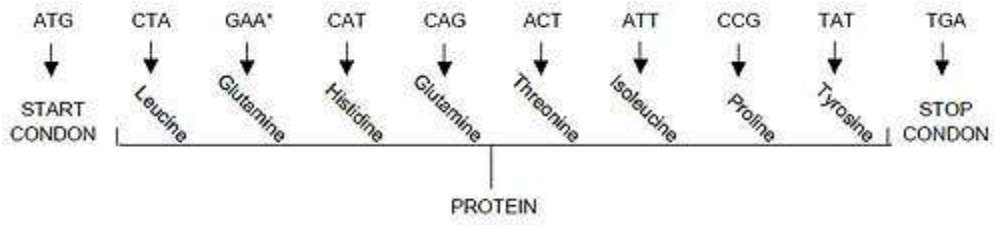


As the cellular machinery for reading the DNA moves along the strand of DNA, it reads the codons and translates that message into the corresponding amino acid. Since there are 64 possible codons but only 20 amino acids, most amino acids are coded by several different

codons. For example, the amino acid isoleucine is coded by ATT, ATC, and ATA. Each amino acid is bound to the next in a stepwise fashion creating a long string of amino acids until the end of the gene (stop codon) is reached.

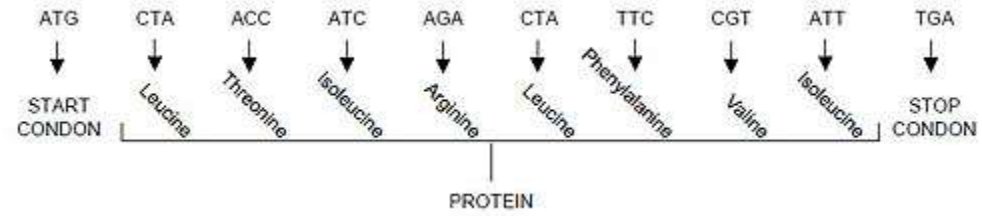
What is a mutation?
A mutation is an alteration in the letter sequence of a gene which causes the gene product, a protein or enzyme, to be manufactured incorrectly. When a protein is made improperly, it is usually ineffective and thus cannot perform its intended function. This lack of function often leads to disease. This is analogous to a typographical error on a single page of text in the 46-volume set of encyclopedias.

Are all mutations alike?
There are several different types of mutation which can alter a gene. First, there is the **point mutation.**This is the most common form. This type of mutation changes a single letter in the gene text. This typographical error results in the substitution of one amino acid for another in the protein. Using the letter sequence mentioned earlier, a point mutation has been introduced into the gene sequence below.



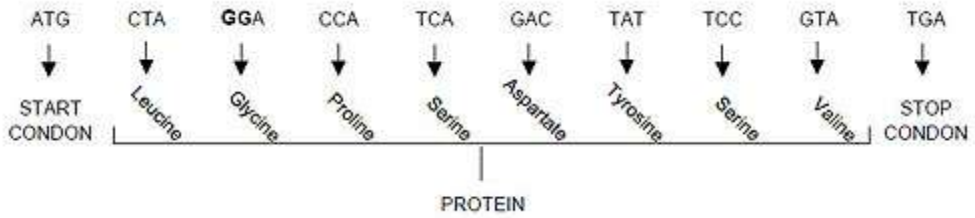
The mutation is marked by an asterisk in codon number 3. This substitution changes a C to an A. This alters the codon so that it no longer designates aspartate (codon GAC), but rather specifies glutamine (GAA). Most mutations of this type change a single amino acid within the protein, leaving the rest of the protein unaffected. The protein is usually manufactured, but often lacks proper function due to the incorrect placement of one amino acid.

A second type of mutation is called a **deletion.** Deletions may be large or small. Some deletions result in the loss of a single letter in the gene, while others may encompass many hundreds or thousands of letters. When some of the gene code is deleted, the protein often cannot be manufactured at all. The figure below illustrates a single letter deletion in codon three. The original codon 3 was GAC. In this example, the G has been deleted so the codon now reads ACC. This deletion shifts all the other letters forward in the sequence and disrupts the normal reading frame of the gene. As a result, the amino acids incorporated into the protein after the deletion are incorrect. This type of mutation often results in a non-functional protein.



A third form of mutation is called an **insertion.** As the name implies, an insertion adds extra letters to the text of the gene. Like the deletion mutation, this type may be small (a single

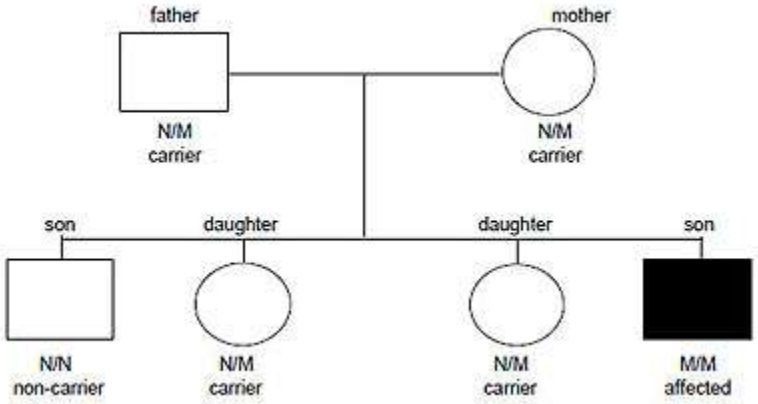
letter insertion) or large (many hundreds or thousands or letters). The end result, though, is the same as a deletion mutation: the protein is manufactured improperly, if at all. As an example, the sequence below has a G insertion in codon 3 (denoted by the outlined letter G). This insertion changes the third codon from GAC to GGA and substitutes glycine for aspartate in the protein. In addition, this insertion causes the reading frame to shift so that all subsequent amino acids are incorrect.



If I carry a mutation, why am I not sick?

Most of the genetic diseases we treat at the Clinic for Special Children are **recessive.** For a recessive genetic disease, both parents are "carriers" of a silent mutation. The mutation is silent in that there is no clinical consequence in being a carrier. Recall that each cell in the body has two copies of every gene, one inherited from the father and one from the mother. The carrier has one version of the gene which has a mutation, while the other copy is normal. The normal copy is able to "mask" the presence of the mutant copy by providing the cells of the body with enough protein to function normally. However, when both copies of a gene contain a mutation, there is no normal protein produced. This leads to disease.

In the diagram below, the **N** represents the normal gene sequence and the **M** represents the mutant gene sequence. The diagram shows that, on average, one out of four children (25%) will inherit two copies of the abnormal gene and, thus, develop the disease. In addition, three out of four children will be unaffected by the disease, but, on average, two of these three will be carriers. The probability of having an affected child remains the same regardless of the number of affected or unaffected children already born to the couple.



A recessive genetic disease occurs in a child only if **both** parents carry a mutation in the same gene. This circumstance is usually rare. However, in plain [Mennonite & Amish] communities, the incidence of **consanguineous** marriages is much higher than the general population. A consanguineous marriage is the union of two individuals who are genetically related. A consanguineous union may be a relatively close relationship (second cousins) or it may be more distant (sixth cousins). Due to the relatively small number of Mennonite and

Amish founders and the lack of migration into the group over the past two centuries, most contemporary Mennonite and Amish individuals are related to their spouses. The closer the relationship between these two individuals, the greater is the probability that they will produce offspring with a genetic disease

How can mutations be detected?
Once a mutation has been identified in a gene, a specific test can be designed to identify individuals who carry that mutation. The Clinic for Special Children offers genetic testing for carrier status for several inherited diseases, namely **maple syrup urine** disease (MSUD), **glutaric aciduria, type 1** (GA1), **medium-chain acyl-CoA dehydrogenase deficiency** (MCADD), **glycogen storage disease, type 6** (GSDVI), **pyruvate kinase deficiency** (PKD), **congenital nephrotic syndrome** (NPHS1), **Byler disease** (FICl), **Hirschsprung disease** (HSCR), and **Crigler-Najjar syndrome, type 1** (CN1).

For each disorder, the test performed identifies a single mutation in the gene (namely Y393N for MSUD, A421V for GA1, K304E for MCADD, IVS13+1G for GSDVI, R479H for PKD, 1481delC for NPHS1, G308V for FIC1, W276C for HSCR, and Y74X for CN1). Currently, research indicates that a single gene mutation for each disorder is found among the Mennonite and Amish populations of Lancaster County, PA. These tests do not detect other mutations within these genes which may cause disease.

NEWS & NOTES - MSUD PICNIC IN PENNSYLVANIA

Details

Written by Martha Newswanger

Published: 20 July 2009

On August 28, 1999 we hosted an MSUD picnic on our farm. It was a beautiful day. There were approximately 90 people here for lunch. There were 8 MSUD families and some relatives, plus the five families here in Blair County, Pennsylvania. There were 21 children with MSUD. The parents and children had a wonderful time of fellowship and exchanging news.

Dr. Morton and his wife, Caroline, spent a few hours with us, bringing along Seth and Sandy Hammers and their baby, Joshua, from New Jersey. Dr. Morton had discharged baby Joshua from the Lancaster General Hospital that morning.

I do believe the children's highlight was the food. Our menu consisted of low protein bread and buns, veggie burgers and even low protein hot dogs. We also had baked potatoes,

green beans in a sauce, sweet corn, low pro macaroni and cheese, and lettuce salad. For dessert there were low protein cookies, melon balls with grapes, and low protein soft ice cream out of a rented soft ice cream machine. (See the RECIPES section for the low protein ice cream recipe.) One side of the machine dispensed "regular" ice cream and the other side low protein ice cream. The first person to fill a cone was a child with MSUD. He was so excited, he filled his cone with regular ice cream before realizing, "Oops, wrong ice cream." Both kinds looked exactly the same.

NEWS & NOTES - GENE REPAIR THERAPY UPDATE

Details

Written by Joyce Brubacher

Published: 20 July 2009

The gene repair therapy project is continuing, albeit slowly. A young man's death after gene therapy was widely reported in the news. This recent tragedy raised serious questions about gene therapy. The good news is that the gene repair therapy by Kimeragen does not use viruses as carriers for the gene. Even the modified viruses used in most gene therapy can cause inflammatory responses. The gene repair that is the hope for a cure in MSUD uses a molecule called a chimeraplast - a combination of DNA and RNA sequences that direct the body's own molecular tools to repair the gene. It differs from regular gene therapy and is expected to reduce the risks.

Human trials on children with Crigler-Najjar Disease are planned for sometime next year. Extensive testing is being done to insure the safety of the therapy.

- from a conversation with Dr. Michael Blaese

SHARING - LIFE WITH MSUD

Details

Written by Kylie Williams

Published: 20 July 2009

Kylie contacted me in January of '99, and I have enjoyed e-mailing with her. Kylie lives in New Zealand and has recently finished a course at Polytech. I asked her to share her experiences and I appreciated her willing and immediate response.

As a patient with maple syrup urine disease, I have to admit life hasn't always been easy. I was born on August 21, 1979, and was diagnosed with the intermittent form of MSUD when they did the heel prick test at five days old.

The alarm bells sounded when the doctors detected that my blood levels were not "the norm" of a healthy baby. After some analysis and discussion, the doctors discovered that I had a condition known as maple syrup urine disease. When told of the diagnosis, my parents were mind blown: they had never heard of it before and had no idea what was ahead of them.

The doctors explained to them that it was a "rare metabolic condition" that affected 1 in 250,000 babies, and there was a one in four chance of producing a child with the condition, if both parents had one gene for MSUD each. My parents were told that they would be able to manage the condition by following the protein-restricted diet set in place by a dietician, and that I would be called in for regular examinations, which would involve checking my weight, blood tests, and eventually my height. The height and weight check was to ensure that my body was developing at the same rate as that of a "normal" child.

Bear in mind that I now manage my own blood tests by doing a finger prick two or three times before each six-month visit to the hospital. Mum said that in the beginning she found it difficult having to keep track of the amount of protein she was giving me, but after a while she said it was second nature.

From birth to five years of age, I was in and out of the hospital more times than you could count on one hand, or for that matter, on two hands. Anything from an ear infection to a common cold could set me off. After numerous ear infections, the doctors decided to put grommet tubes in my ears to see if that would help combat one problem. It did help.

I have only been in the hospital once since the age of nine, and that was unrelated to my MSUD. I handle illnesses now with just diet changes, and with Mum on my tail, I can't go wrong.

I don't remember very many of my visits to the hospital as a youngster, but I do know that on several occasions the doctors were convinced I wasn't going to pull through. I have been told that at my worst, I would go into a comatose state and would have severe fits [seizures]. My mother tells me that I would arch my back, and there was nothing anyone could do to stop it; they just had to wait for it to pass over. When hospitalized, I would be put on an IV line for my fluid, and my protein intake would be reduced.

Each time I pulled through, both my parents and the doctors were amazed. Mum said when things got really bad she would get down on her knees and pray that I would pull through. Prior to my birth in 1979, my parents had given birth to a boy called Scott. He was born two years before me. Although he had the same condition, it went undiagnosed at birth. He lived to

be just over a year old, and died as a result of an MSUD attack brought on by a routine immunization for the measles.

Since no one knew that he had MSUD, the doctors said his death resulted from a problem with his brain. So they performed an autopsy to try and find out what had gone wrong. It was only after I was born that the pieces of the puzzle fell into place, and they realized they had been off the mark with their previous diagnosis for the cause of death. If Scott were alive today, he would be 22.

MSUD became part of the Guthrie screening tests in New Zealand following my birth and diagnosis. I am the only MSUD patient in New Zealand that I know of. There was a little Chinese baby with a more severe form than I, but I don't think the child survived.

As for me, well, I have made it to 20 years of age. I have been able to gradually increase my protein over the years to 45 grams per day. I only need to take formula when I am sick. One thing is for certain, if it weren't for the doctors at Dunedin hospital - specifically Professor Mortimer, as well as my dietitians, and my parents - I am certain I would never have made it. I owe my life to a lot of people, and I will always be eternally grateful for the help and support in getting me back to full health.

SHARING - GRANDSON WITH MSUD

Details

Written by John and Barb Berger

Published: 20 July 2009

John and Barb Berger from Versailles, OH are the grandparents of Jordan Bulcher. Jordan was very sick as an infant, but tolerates a rather liberal classic diet.

Jordan Bulcher is our grandson. He was diagnosed with MSUD at 17 days of age. Although he has had some rough times in the past, the last year has been a very good one for him with no hospital stays. Jordan is now a very bright, caring ten year old and a delight to be around.

One of our main concerns with Jordan, as grandparents, has been all of our family get-togethers where food is abundant. He is very comfortable with his diet and does not seem to be bothered by what any of his many cousins are eating.

Jordan's parents, Sandy and Dave Bulcher, have done a terrific job of teaching Jordan his food limitations. He is able to calculate his daily food intake, even when they are not

present. Tyler, Jordan's older brother, is very helpful to him also. Jordan has a strong family unit which is very comforting to us as grandparents. We hope someday more help will be available with diagnoses and formula cost for all MSUD people.

SHARING - A GRANDPARENT'S PERSPECTIVE

Details

Written by Lillian Westdorp

Published: 20 July 2009

Lillian is the grandmother of Jenna and Jesse Kiel who have classic MSUD. They are the children of Carl and Sandy Kiel from Michigan. The family was featured in our spring '95 issue. Jenna is now 8 and Jesse is 6.

Before Jenna was born, I had never heard of MSUD, and what it involves for a family. It was very hard at first to eat what we considered to be "good" food, knowing that Jenna couldn't have any. But Jenna and Jesse seem to take it mostly in stride. This summer while they were camping with us, we had fish for supper one night. Jesse said, "Fish are yucky to eat, aren't they Grandpa?" and Grandpa said, "They are if you don't like them."

When the kids come over to my house, I try to have the special boxes of macaroni for them: Animaniacs or ABC's shapes.* Jesse loves lots of ketchup with his macaroni. In fact he likes ketchup with most everything! I've noticed if I put out candy for all the grandkids, the Skittles dish is empty before the M & M's, which I always thought were the favorite candy. Jenna and Jesse are delighted if I buy melon during the winter for them. Jenna likes watermelon and Jesse likes cantaloupe, which he calls "orange melon." Their ice cream has always been Cool Whip with sprinkles, but now Sandy tells me, we can freeze French Vanilla nondairy creamer, which should be more like ice cream.

Sandy usually has treats at school for them if other kids pass out something they can't have. The teachers are very accommodating at school - they will call if they know someone is bringing something special, so Sandy can make something similar for Jenna and Jesse to eat.

I remember taking them to McDonald's for a Happy Meal and they got the fries, drink and toy, and I ate the hamburger. After playing on the toys awhile, Jenna wanted to get the free little ice cream cone they were giving to kids. I said, "You can't have that can you?" She said, "Not the ice cream, but I will just ask for the cone." It helps a lot that they understand what they can eat, and usually they accept that very well. All in all, they are happy, fun kids and we're enjoying them a lot as grandparents.

Note from Sandy (Mom): Jenna and Jesse say that Grandma Westdorp is special because she always has candy for the kids. When our whole family gets together, she always creates a special dessert just for them - their favorite is made with an Oreo crust, Cool Whip, and sprinkles on top. On Valentines Day she brings over bags of goodies for the kids, and Jenna and Jesse get protein-free candies, and special heart-shaped Krispie bars. She always brings us wonderful fresh fruit - even when it's out-of-season and expensive! Grandmas are SPECIAL!

* Not a low protein pasta.

SHARING - ON THE DIET FOR ALMOST THIRTY YEARS

Details

Written by Shayla & Joyce Brubacher

Published: 20 July 2009

Shayla's Story
I've had lots of experience with the diet for classic MSUD - I'll be 30 in March 2000 and have been on the diet from birth. I find it hard to be on a diet and eat mostly junky food and drink a synthetic medical food instead of the good tasting, high protein food others eat. It seems my restricted diet causes me health problems as I get older. I've been trying to eat more fruits and vegetables. However, I don't like some of them and am allergic to others I do like, such as grapefruit, oranges, tomatoes, and bananas.

Several years ago I felt dizzy and sick in the stomach and had headaches. It seemed I was experiencing hypoglycemia. So I started eating snacks between meals and eating before I go to bed. That seems to help. It was really scary when I momentarily lost my vision when I was driving with a bad headache. I now take an Aleve as soon as I feel a headache coming on, and be sure I always take food and drink along when I drive. That really seems to help. I get headaches when my levels are elevated.

I really didn't understand my diet until I was a teenager. It wasn't easy to learn to take care of my diet myself. I learned to look up foods when I didn't know the protein value, and now it is a way of life.

When I am offered foods I can't eat, I say, "I can't eat it or I will end up in the hospital." If they ask more questions, I tell them I am on a special low protein diet. I try not to mention MSUD because it is too involved to explain. I am mostly with people I grew up with or who knew me from childhood. That makes it easier, and I don't have to explain so much.

I was teased in school and I could never take teasing, even good-natured teasing from my Dad and brothers, except from Monte, who was my good friend. I got disgusted with the teasing at school and took the book, *Please don't tease me*... to school, and every classroom teacher read it to their students. This helped stop the teasing. I recommend this book [by Jane M. Madsen with Diane Brockoras] for all school children and others.

I can hardly wait for the gene repair therapy. Then I can drink my first big gulp of milk and start eating other high protein foods. That would be like heaven to me.

Mom's Report

Shayla has been wanting to share her story in the Newsletter, but "Mom" never seemed to have time to help her. So this time I promised to get it down on paper for her - especially when October came and there was still nothing for the SHARING or FAMILY HISTORY sections of the Newsletter. I was feeling a little desperate.

Shayla is our daughter (Wayne and Joyce Brubacher, the editor) from Goshen, Indiana. Shayla's oldest brother, Monte, was diagnosed at 12 days of age in March 1965 with classic MSUD (now known as Mennonite classic). So when Shayla was born on March 7, 1970, she was taken to the hospital in Ann Arbor, Michigan the next day to be tested. She tested positive for MSUD. Our second son, born in 1966, and a third son, a year younger than Shayla are both unaffected.

Shayla was given Enfamil for12 hours to be sure the levels were high enough to show on the test. She was started on the MSUD formula at 55 hrs. of age with a leucine level of 9 mg/dl.

She soon developed a very bad, painful rash on her bottom from an isoleucine deficiency. (It was not recognized as such at that time.) Since there was no one experienced with Monte's diet, I was not comfortable leaving him at home for any length of time to stay with Shayla in the hospital. In retrospect, Shayla was the one who needed me most.

Since Shayla was vomiting her feedings and her levels were not stabilized at three months, I stayed at the hospital and cared for her several days at that time. I soon realized she was sensitive to the way different nurses fed her. One nurse used a nipple with the hole cut so big that Shayla would gulp the formula and soon chuck it back up. Some nurses warmed her formula and others gave it cold.

The miserable rash on her bottom finally healed, and she began to stabilize after the doctor added isoleucine and valine to her formula. With more constant care, she was ready to come home at almost 15 weeks of age. She seemed so small and frail. She weighed only 6 lbs. 7 oz. and measured 17, in. at birth. She weighed around 9 lbs. when released from the hospital.

Complete formulas were not available in those days. Shayla's formula, however, was easier to mix than Monte's infant formula had been. I had to totally mix his concoction from scratch. Her formula was a combination of Products Z618 and Z619 from Mead Johnson, amino acids, strained lamb baby food, valine (for the first week only), Mullsoy and water. If I remember correctly, Product Z618 mainly contained sources of calories and Z619 was a vitamin and

mineral mixture. It was not an attractive formula. It didn't smell or taste good and was not easy to get through a nipple. However, Shayla thrived on this ickylooking formula.

Monte grew to be a strong and healthy nine year old. He functioned normally and worked and played with gusto. He died suddenly from cerebral edema during a light case of flu in Dec. '74. Shayla was four and one half at the time he died.

When Shayla started with flu symptoms the following February, we panicked and took her to the hospital for her first hospitalization since her initial stay. It was stressful for her to travel three hours and wait several hours to get into a room before finally getting started on IVs. This made her much sicker than being at home. I was too sick with the flu myself to stay with her. A nurse mistakenly gave her a big, normal breakfast the fifth day, insisting she eat it, and her levels soared to 28 mg/dl. We were asked to come get her. It took me three weeks at home to get her levels down.

Shayla was hospitalized again at nine when she seemed to hallucinate with a mild case of the flu. It was quite stressful for her to be in the hospital, and we are very thankful she has not needed to be hospitalized since. (Those were her only two hospitalizations other than at birth.)

Shayla met developmental milestones the first several years - sat at 6 months and walked at 12 months. But school was difficult for her. She attended a private Christian school just across the road from our house. I worked closely with her teachers, and we eventually put her on a self-paced course which was mostly done at home after school hours. She attended school for 10 years. Testing at that time showed she was working at a very high frustration level, and we were advised to keep her home and teach her basic skills.

Although tests indicated she had reached her academic potential, she has increased her IQ it seems by sheer determination. She takes care of her own diet, cooking all kinds of concoctions with her low protein foods. She has been driving since 1993. This gives her some of the independence she longs for so much.

As an adult, Shayla's leucine levels fluctuated from 7 to 9 mg/dl, until three years ago when she started adding isoleucine and valine supplements to her formula. This made it much easier for her to keep her leucine levels in the 3 to 6 mg/dl range and curb her big appetite. She is better satisfied and has lost some weight.

The biggest change since adding isoleucine and valine is in her ability to reason and think more clearly. She is also more stable emotionally and has fewer headaches. Shayla has resumed her schooling with a home school course and her reading is improving.

Shayla is easily distracted. She tends to throw herself into her activities and then crashes. It is difficult for her to organize tasks or work in a bustling environment. This makes it difficult to hold a job. She now works part-time for a friend of the family doing housework and odd jobs. She is a very thorough in her work and her employer really appreciates her.

It is never boring with Shayla around. She has broken a leg and two bones in her wrist and been hit by a car while riding a bicycle. Always pushing her limits, she is a very determined young lady.

Shayla is my much appreciated helper around the house. She does most of the housework when I am busy with MSUD matters. She loves to travel and enjoys her job - and earning spending money. She likes to refinish antique furniture and worked on several projects this fall. She is our challenge and our blessing.

SHARING - OUR EXPERIENCE WITH RITALIN

Details

Written by Glenda Groff

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Jordan, born on June 29, 1991, is the son of Ernest and Glenda Groff from Pennsylvania. Glenda (our Food News editor) wrote about him for the Family History section in the December '92 issue of the Newsletter. The next year, she gave an account of a time when Jordan was seriously ill. ("He's Our Miracle," Dec. '93.) He has done very well since then.

Last year when Jordan started school, I had no idea how this was going to work. I couldn't imagine him sitting still for one hour, much less a whole day. School was in session three weeks when I received a call: his teacher was wondering if we had considered putting him on Ritalin. She felt it would not be fair to let him struggle with his schoolwork when there was help available. After discussing the situation with Dr. Morton, we decided to try a low dose of Ritalin. The results we got with a below average dose of the medication were amazing. Jordan also began with a tutor in math at this time.

In the hustle and bustle one morning, I forgot to give him his Ritalin. That afternoon I received a phone call from his tutor. Her first question was, "Did Jordan take his Ritalin today?" Thinking back, I did not recall giving it to him. That day his schoolwork suffered from his lack of attention. We quickly learned not to forget his Ritalin in the morning because the results were frustrating to him.

Part way through the school year, we started adding tyrosine in capsule form in the morning. Jordan would take 5 mg of Ritalin and 1000 mg of tyrosine. The combination seemed to work very well as long as we were consistent in giving them to him. When we missed the tyrosine, Jordan walked in his sleep. As soon as we started it again, he stopped walking in his sleep.

Over the summer, I discontinued the Ritalin and continued with the tyrosine. That seemed to work very well. When school started, we again added the Ritalin. This time it took 10 mg to accomplish the results we wanted.

One day I again sent him to school without Ritalin, because I had neglected to get the prescription filled. His tutor again could tell from Jordan's behavior that he had not taken it. Jordan told her his mother had forgotten to get him more. He came home with this message from his tutor: "Tell your mother to get your pills - you need them." Needless to say, that evening found me waiting at the pharmacy for his prescription. We learned he really depends on them for his schoolwork.

One disadvantage of Ritalin is the loss of appetite. Jordan's first school year found lunches untouched, and he wouldn't eat breakfast. He was starving when he got home, and could hardly get enough to eat after school. I was concerned, but he did not lose any weight throughout the school year. I told him if he isn't hungry at school, he must at least drink his formula. This year we have not seen the loss of appetite as a problem. Most days his lunch box comes home from school completely empty, and he is digging through the pantry and refrigerator for something to eat as soon as he is in the door.

We feel the advantages of Ritalin far out weigh the disadvantages. His schoolwork has dramatically improved. By the time he comes home, the effects of the medication have worn off, and he is his normal active self. When I go out to call him, I can often find him dangling out of the maple tree in our side yard. He also put a plywood piece in the tree as his tree stand and spends his evenings with a stick for his bow, hunting deer.

Jordan is still very active, but Ritalin has made his school life more enjoyable. The other students have learned what he may eat and bring the treats he may have. When hot lunch is brought to school, I often need to send something along to complete the meal for him, but most parents work very well with his diet.

We are very pleased with Jordan's health the last few years. It has been six years since he has been in the hospital. He does get the occasional flu that goes around. Last year, he spent only five days home from school which I thought was excellent. He is a willing helper when I need one and was delighted with another little brother this summer. So our days are full, busy ones.