HUMAN MILK FOR HUMAN BABIES

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MOTHERS’ MILK BANK
DISCLOSURES

• I WORK FOR MOTHERS’ MILK BANK, A NONPROFIT ORGANIZATION
OBJECTIVES

• DESCRIBE THE SCREENING PROCESS FOR DONOR HUMAN MILK.
• DESCRIBE THE PROCESSING AND TESTING OF DONOR HUMAN MILK.
• DISCUSS WHY MOTHERS CHOOSE TO DONATE
• DEFINE TYPES OF MILK RECIPIENTS
MOM’S OWN MILK FROM DIRECT BREASTFEEDING IS ALWAYS THE OPTIMAL FEEDING CHOICE
TERMINOLOGY

DONOR HUMAN MILK – DHM OR PDHM

MOM’S OWN MILK OR JUST MILK
udder milk or goat’s milk?
HUMAN MILK

• NAMED FOR THE SPECIES FROM WHICH IT COMES, NOT THE ORGAN!
• Argentina
• Australia
• Brazil
• Bulgaria
• Canada
• Cameroon
• Chile
• China
• Costa Rica
• Cuba
• Czech Republic
• Denmark
• Dominican Republic
• Finland
• France
• Germany
• Greece
• India
• Iran
• Italy

• Kuwait
• Mexico
• Netherlands
• Nicaragua
• Norway
• Panama
• Poland
• Spain
• Russia
• Slovakia
• South Africa
• Spain
• Sweden
• Switzerland
• Taiwan
• United Kingdom
• United States
• Uruguay
• Venezuela

• 39 countries
NEW MILK BANK OPENS IN IRAN 2016
INTERNATIONAL NEWS

• BRAZIL HAS 217 BANKS
• NORWAY PAY DONORS AND DON’T PASTEURIZE
• AUSTRALIA NOW HAS 4 BANKS
• VIETNAM WILL OPEN THEIR FIRST BANK IN 2017
SAFETY, SCIENCE, ETHICS AND ADVOCACY – HMBANA PRINCIPLES

• SAFETY – 30+ YEARS OF EXPERIENCE WITH PROVIDING LIFESAVING TREATMENTS TO MEDICALLY FRAGILE INFANTS IN NORTH AMERICA

• SCIENCE – MULTIDISCIPLINARY COLLABORATIONS AMONGST HOSPITALS, HEALTH CARE PROFESSIONALS, SCIENTISTS AND HMBANA BANKS. RESEARCHING AND SUPPORTING THE SAFETY OF PASTEURIZED DONOR HUMAN MILK (HOLDER METHOD) TREATMENTS
HMBANA PRINCIPLES

• ETHICS – ALTRUISM, TREATING THE MOST VULNERABLE INFANTS FIRST, CHARITABLE CARE

• ADVOCACY – ADVOCATING FOR BREASTFEEDING, HUMAN MILK FOR MEDICALLY FRAGILE INFANTS, SAFETY, EDUCATION, RESEARCH, LEGISLATIVE ADVANCEMENTS, REDUCING HEALTH DISPARITIES.
FEBRUARY 2012 STATEMENT

“BREASTFEEDING AND HUMAN MILK ARE THE NORMATIVE STANDARDS FOR INFANT FEEDING AND NUTRITION. GIVEN THE DOCUMENTED SHORT- AND LONG-TERM MEDICAL AND NEURODEVELOPMENTAL ADVANTAGES OF BREASTFEEDING, INFANT NUTRITION SHOULD BE CONSIDERED A PUBLIC HEALTH ISSUE AND NOT ONLY A LIFESTYLE CHOICE. THE AMERICAN ACADEMY OF PEDIATRICS REAFFIRMS ITS RECOMMENDATION OF EXCLUSIVE BREASTFEEDING FOR ABOUT 6 MONTHS, FOLLOWED BY CONTINUED BREASTFEEDING AS COMPLEMENTARY FOODS ARE INTRODUCED, WITH CONTINUATION OF BREASTFEEDING FOR 1 YEAR OR LONGER AS MUTUALLY DESIRED BY MOTHER AND INFANT.”
PEDIATRICS – 2012
BREASTFEEDING AND THE USE OF HUMAN MILK

• “IF MOTHER’S OWN MILK IS UNAVAILABLE DESPITE SIGNIFICANT LACTATION SUPPORT, PASTEURIZED DONOR MILK SHOULD BE USED.”

• ACOG, USBC, PATH, AAP ENDORSEMENT, OTHER PROFESSIONAL ORGANIZATIONS.
AAP POLICY STATEMENT DECEMBER 2016

• “THE EVIDENCE TO SUPPORT THE USE OF DONOR HUMAN MILK HAS BEEN REVIEWED, AND RECENT STUDIES SUPPORT HEALTH BENEFITS FOR ITS USE IN INFANTS.”

• “DONOR HUMAN MILK BANKS REPRESENT A SAFE AND EFFECTIVE APPROACH TO OBTAINING, PASTEURIZING AND DISPENSING HUMAN MILK FOR USE IN NICUS AND OTHER SETTINGS.”
Nonfat Milk, Lactose, Whey Protein Concentrate, High Oleic Safflower Oil, Soy Oil, Coconut Oil, Galactooligosaccharides. Less than 2% of: C. Cohnii Oil, M. Alpina Oil, Beta-Carotene, Lutein, Lycopene, Potassium Citrate, Calcium Carbonate, Ascorbic Acid, Soy Lecithin, Potassium Chloride, Magnesium Chloride, Ferrous Sulfate, Choline Bitartrate, Choline Chloride, Ascorbyl Palmitate, Salt, Taurine, m-Inositol, Zinc Sulfate, Mixed Tocopherols, d-Alpha-Tocopheryl Acetate, Niacinamide, Calcium Pantothenate, L-Carnitine, Vitamin A Palmitate, Cupric Sulfate, Thiamine Chloride Hydrochloride, Riboflavin, Pyridoxine Hydrochloride, Folic Acid, Manganese Sulfate, Phyloquinone, Biotin, Sodium Selenate, Vitamin D3, Cyanocobalamin, Calcium Phosphate, Potassium Phosphate, Potassium Hydroxide, and Nucleotides (Adenosine 5’-Monophosphate, Cytidine 5’-Monophosphate, Disodium Guanosine 5’-Monophosphate, Disodium Uridine 5’-Monophosphate).

Contains milk and soy ingredients.
HUMAN MILK COMPOSITION

- WATER
- CARBOHYDRATES (ENERGY SOURCE)
- LACTOSE
- OLIGOSACCHARIDES
- CARBOXYLIC ACID
- ALPHA HYDROXY ACID
- LACTIC ACID
- PROTEINS (BUILDING MUSCLES AND BONES)
- WHEY PROTEIN
- ALPHA-LACTALBUMIN
- HAMLET (HUMAN ALPHA-LACTALBUMIN MADE LETHAL TO TUMOUR CELLS)
- LACTOFERRIN
- MANY ANTIMICROBIAL FACTORS (SEE BELOW)
- CASEIN
- SERUM ALBUMIN
HUMAN MILK

- CREATININE
- UREA
- URIC ACID
- PEPTIDES (SEE BELOW)
- AMINO ACIDS (THE BUILDING BLOCKS OF PROTEINS)
  - ALANINE
  - ARGinine
  - ASPARTATE
  - CLYCINE
  - CYSTINE
  - GLUTAMATE
  - HISTIDINE
  - ISOLEUCINE
  - LEUCINE
  - LYCINE
  - METHIONINE
• METAL
• MOLYBDENUM (ESSENTIAL ELEMENT IN MANY ENZYMES)
• GROWTH FACTORS (AID IN THE MATURATION OF THE INTESTINAL LINING)
• CYTOKINES
• INTERLEUKIN-1B (IL-1B)
• IL-2
• IL-4
• IL-6
• IL-8
• IL-10
• GRANULOCYTE-COLON HY STIMULATING FACTOR (G-CSF)
• MACROPHAGE-COLON HY STIMULATING FACTOR (M-CSF)
• VASCULAR ENDOTHELIAL GROWTH FACTOR (VEGF)
• HEPATOCYTE GROWTH FACTOR - □ (HGF-□)
• HGF-□
• TUMOR NECROSIS FACTOR- □
• INTERFERON- □
• EPITHELIAL GROWTH FACTOR (EGF)
• TRANSFORMING GROWTH FACTOR- □ (TGF-□)
• TGF □1
• TGF-□2
• FATS
  • TRIGLYCERIDES
  • LONG-CHAIN POLYUNSATURATED FATTY ACIDS
  • DOCOSAHEXAENOIC ACID (DHA) (IMPORTANT FOR BRAIN DEVELOPMENT)
  • ARACHIDONIC ACID (AHA) (IMPORTANT FOR BRAIN DEVELOPMENT)
  • LINOLEIC ACID
  • ALPHA-LINOLENIC ACID (ALA)
  • EICOSAPENTAENOIC ACID (EPA)
  • CONJUGATED LINOLEIC ACID (RUMENIC ACID)
  • FREE FATTY ACIDS
  • MONOUNSATURATED FATTY ACIDS
  • OLEIC ACID
  • PALMITOLEIC ACID
• HEPTADECENOIC ACID
• SATURATED FATTY ACIDS
• STEARIC
• PALMITIC ACID
• LAURIC ACID
• MYRISTIC ACID
• PHOSPHOLIPIDS
• PHOSPHATIDYLCHOLINE
• PHOSPHATIDYLETHANOLAMINE
• PHOSPHATIDYLCHOLINE
• PHOSPHATIDYLETHANOLAMINE
• PHOSPHATIDYLCHOLINE
• PHOSPHATIDYLCHOLINE
• LYSOPHOSPHATIDYLCHOLINE
• LYSOPHOSPHATIDYLETHANOLAMINE
HUMAN MILK

- SPHINGOLIPIDS SQUALENE
- LANOSTEROL
- DIMETHYSTEROL
- METHOSTEROL
- LATHOSTEROL
- DESMOTHEROL
- TRIACYLGlycerol
- CHOLESTEROL
- 7-DEHYDROCHESTEROL
- STIGMA-AND CAMPESTEROL
- 7-KETOCHOLESTEROL
- SITOSTEROL
- β-LATHOSTEROL
- VITAMIN D METABOLITES
- STEROID HORMONES
- SPHINGOMYELIN
- GANGLIOSIDES
- GM1
- GM2
- GM3
- GLUCOSYLCERAMIDE
- GLYCOSPHINGOLIPIDS
- GALACTOSYLCERAMIDE
- LACTOSYLCERAMIDE
- GLOBOTRIAOSYLCERAMIDE (GB3)
- GLOBOSIDE (GB4)
- STEROLS
HUMAN MILK

- VITAMINS
  - VITAMIN A
  - BETA CAROTENE
  - VITAMIN B6
  - VITAMIN B8 (INOSITOL)
  - VITAMIN B12
  - VITAMIN C
  - VITAMIN D
  - VITAMIN E
  - A-TOCOPHEROL
  - VITAMIN K
  - THIAMINE
  - RIBOFLAVIN
  - NIACIN
  - BIOTIN
  - MINERALS
  - CALCIUM
  - SODIUM
  - POTASSIUM
  - IRON
  - ZINC
  - CHLORIDE
  - PHOSPHORUS
  - MAGNESIUM
  - COPPER
  - MANGANESE
  - IODINE
• SERINE
• TAURINE
• THERONINE
• TRYPTOPHAN
• TYROSINE
• VALINE
• CARNITINE (AMINO ACID COMPOUND NECESSARY TO MAKE USE OF FATTY ACIDS AS AN ENERGY SOURCE)
• NUCLEOTIDES (CHEMICAL COMPOUNDS THAT ARE THE STRUCTURAL UNITS OF RNA AND DNA)
  • 5’-ADENOSINE MONOPHOSPHATE (5’-AMP)
  • 3’:5’-CYCLIC ADENOSINE MONOPHOSPHATE (3’:5’-CYCLIC AMP)
  • 5’-CYTIDINE MONOPHOSPHATE (5’-CMP)
  • CYTIDINE DIPHOSPHATE CHOLINE (CDP CHOL
• CYTIDINE DIPHOSPHATE CHOLINE (CDP CHOLINE)
• GUANOSINE DIPHOSPHATE (UDP)
• GUANOSINE DIPHOSPHATE - MANNOSE
• 3’- URIDINE MONOPHOSPHATE (3’-UMP)
• 5’-URIDINE MONOPHOSPHATE (5’-UMP)
• URIDINE DIPHOSPHATE (UDP)
• URIDINE DIPHOSPHATE HEXOSE (UDPH)
• URIDINE DIPHOSPHATE-N-ACETYL-HEXOSAMINE (UDPAH)
• URIDINE DIPHOSPHOGLUCURONIC ACID (UDPGA)
• SEVERAL MORE NOVEL NUCLEOTIDES OF THE UDP TYPE
- PEPTIDES (COMBINATIONS OF AMINO ACIDS)
- HMGF I (HUMAN GROWTH FACTOR)
- HMGF II
- HMGF III
- CHOLECYSTOKININ (CCK)
- ☹-ENDORPHINS
- PARATHYROID HORMONE (PTH)
- PARATHYROID HORMONE-RELATED PEPTIDE (PTHRP)
- ☹-DEFENSIN-1
- CALCITONIN
- GASTRIN
- MOTILIN
- MOTILIN
- BOMBESIN (GASTRIC RELEASING PEPTIDE, ALSO KNOWN AS NEUROMEDIN B)
- NEUROTENSIN
- SOMATOSTATIN
- HORMONES (CHEMICAL MESSENGERS THAT CARRY SIGNALS FROM ONE CELL, OR GROUP OF CELLS, TO ANOTHER VIA THE BLOOD)
- CORTISOL
- TRIIODOTHYRONINE (T3)
- THYROXINE (T4)
- THYROID STIMULATING HORMONE (TSH) (ALSO KNOWN AS THYROTROPIN)
• THYROID RELEASING HORMONE (TRH)
• PROLACTIN
• OXYTOCIN
• INSULIN
• CORTICOSTERONE
• THROMBOPOIETIN
• GONADOTROPIN-RELEASING HORMONE (GNRH)
• GRH
• LEPTIN (AIDS IN REGULATION OF FOOD INTAKE)
• GHRELIN (AIDS IN REGULATION OF FOOD INTAKE)
• ADIPONECTIN

• FEEDBACK INHIBITOR OF LACTATION (FIL)
• EICOSANOIDS
• PROSTAGLANDINS (ENZYMATICALLY DERIVED FROM FATTY ACIDS)
• PG-E1
• PG-E2
• PG-F2
• LEUKOTRIENES
• THROMBOXANES
• PROSTACYCLINS
• ENZYMES (CATALYSTS THAT SUPPORT CHEMICAL REACTIONS)
- COMPLEMENT C7
- COMPLEMENT C8
- COMPLEMENT C9
- GLYCOPROTEINS
  - MUCINS (ATTACHES TO BACTERIA AND VIRUSES TO PREVENT THEM FROM CLINGING TO MUCOUSAL TISSUES)
- LACTADHERIN
- ALPHA-LACTOGLOBULIN
- LEUKOCYTES (WHITE BLOOD CELLS)
  - STEM CELLS
- PHAGOCYTES
- BASOPHILS
- NEUTROPHILS
- EOSINOPHILS
- MACROPHAGES
- LYMPHOCYTES
- B LYMPHOCYTES (ALSO KNOWN AS B CELLS)
- T LYMPHOCYTES (ALSO KNOWN AS C CELLS)
  - COMPLEMENT C7
  - COMPLEMENT C8
  - COMPLEMENT C9
• ALPHA-LACTOGLOBULIN

• SIGA (SECRETORY IMMUNOGLOBULIN A - ANTI-INFECTIVE FACTOR)

• COMPLEMENT C4

• COMPLEMENT C5
• COMPLEMENT C6
• COMPLEMENT C7
• COMPLEMENT C8
• COMPLEMENT C9
• GLYCOPROTEINS
  ▫ MUCINS (ATTACHES TO BACTERIA AND VIRUSES TO PREVENT THEM FROM CLINGING TO MUCOUSAL TISSUES)
• LACTADHERIN
• ALPHA-LACTOGLOBULIN
• ALPHA-2 MACROGLOBULIN
• LEWIS ANTIGENS
• RIBONUCLEASE
• HAEMAGGLUTININ INHIBITORS
• BIFIDUS FACTOR (INCREASES GROWTH OF LACTOBACILLUS)
## The Non-Nutritional Value of Human Milk – Dose related

<table>
<thead>
<tr>
<th>Age</th>
<th>Any</th>
<th>Exclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 mo</td>
<td>- otitis (25%)</td>
<td>- NEC (77%)</td>
</tr>
<tr>
<td></td>
<td>- gastro (65%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- NEC (58%)</td>
<td></td>
</tr>
<tr>
<td>3-6 mo</td>
<td>- type II DM (40%)</td>
<td>- otitis (50%)</td>
</tr>
<tr>
<td></td>
<td>- celiac (52%)</td>
<td>- hosp/severity RSV (74%)</td>
</tr>
<tr>
<td></td>
<td>- inflamm bowel (31%)</td>
<td>- asthma/atopy (42%)</td>
</tr>
<tr>
<td></td>
<td>- SIDS</td>
<td>- type I DM (30%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- SIDS (36%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- leukemias (12%)</td>
</tr>
<tr>
<td>≥ 6 mo</td>
<td></td>
<td>- leukemias (20%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- serious URI/pharyn (65%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- cognition and behavior</td>
</tr>
</tbody>
</table>
HEALTH OUTCOMES – BF REDUCES INCIDENCE OF:

- SIDS
- TYPE 1 AND 2 DIABETES
- LYMPHOMA
- LEUKEMIA
- HODGKIN DISEASE
- OVERWEIGHT AND OBESITY
- HYPERCHOLESTEROLEMIA
- ASTHMA
WET NURSING
WET NURSE SCREENING

• WOMAN - PHYSICAL EXAM – SYPHILIS & GONNORRHEA, TEETH, TUBERCULOSIS SYMPTOMS

• HER BABY

• IDEAL: “18-35 YEARS OLD, GOOD QUALITY MAMMARY GLANDS AND SUFFICIENTLY DEVELOPED NIPPLES”, HAVING MORE THAN 1 LIVING CHILD

• 1906 – AAP WET NURSE REGISTRY
MILK BANKING HISTORY

* 1909 US FIRST MILK BANK - EUROPE/SCANDINAVIA
• 1943 AAP DEVELOPED FIRST GUIDELINES
* 1950 1ST AABB GUIDELINES
* 1970’S – 29 BANKS IN US
* 1980’S CLOSURE OF BANKS
* 1984 DENVER BANK OPENS!
* 1986 HMBANA ORGANIZED
MOTHERS’ MILK BANK, DENVER CO

- OPENED IN MAY 1984
- ADVISORY COUNCIL & MEDICAL DIRECTOR
- TO ST. LUKE’S IN 1985
- PART OF ROCKY MTN CHILDREN’S HEALTH FOUNDATION
- COME AND VISIT!
ROCKY MOUNTAIN CHILDREN’S HEALTH FOUNDATION

OFFERS ASSISTANCE TO HELP FAMILIES COPE WITH THE CHALLENGES AND EXPENSES THAT OFTEN OCCUR WHEN A CHILD IS SERIOUSLY INJURED OR ILL.

• **PATIENT & FAMILY ASSISTANCE** PROVIDES DIRECT SUPPORT TO PATIENTS AND FAMILIES TO HELP COVER CRITICAL NON-MEDICAL COSTS SUCH AS GAS AND GROCERY CARDS, TAXI VOUCHERS AND SOCIAL WORKER AND EMERGENCY GRANTS TO FAMILIES IN NEED OF ASSISTANCE.

• TO FAMILIES WITH BABIES IN THE NICUS BY PROVIDING CAR SEATS, DIAPERS, BLANKETS, CLOTHING AND OTHER ESSENTIALS.

• FOR PEDIATRIC PATIENTS AND THEIR FAMILIES BY CREATING EVENTS AND ACTIVITIES TO HELP EASE THE STRESS OF THE LONG AND INTENSIVE TREATMENTS THESE PATIENTS MUST OFTEN UNDERGO.

• FOR PERINATAL SERVICES TO MOTHERS AND INFANTS WITH CANCER AND OTHER SERIOUS HEALTH CONDITIONS.

• TOYS AND BOOKS TO BOOST MORALE AND CREATE A SENSE OF COMMUNITY FOR THE PEDIATRIC PATIENT AND FAMILY POPULATION.
MMB STATISTICS

• 2016 - 740,000 OUNCES DISPENSED = 23,125 QTS. = 5781 GALLONS

• 85% TO HOSPITALS - 28 IN CO, 2 IN NM

• 140 TOTAL HOSPITALS IN US – LARGEST MMB IN N.A.

• MILK CAME FROM 1300 NEW DONORS – 1/2 FROM CO

2017 – PROJECTING 850,000 OZ. DISPENSED

2018 - 1 MILLION
OUR WONDERFUL MILK DONORS!
WHY I BECAME A DONOR

When my daughter Evelyn was 1 week old she was admitted to Rocky Mountain Hospital for Children, as she was very sick with what we later found was Hirschsprung's Disease. I was a very, very scared mother. Albeit scary, our experience over the next 3 months at RMHC was very positive and now Evelyn is a very healthy almost 1 year old. When my milk supply grew to a level that could no longer fit in our deep freezer, donating to MMB seemed like a very natural decision. I was hoping to give back to a place helped us so much, and I was also happy to be able to give something so important and precious to other sick babies of scared mothers. I hope to never be on the receiving end of milk donation, but it is nice to know that such a wonderful organization such as this exists. Thank you for what you do! Best, Jenny, Jacob and Evelyn.
THE NEED FOR DONORS

- HEALTHY NURSING MOMS WHO HAVE EXTRA MILK
- IT’S EASY TO BE A DONOR!
- YOU CAN HELP IDENTIFY POTENTIAL DONORS
- KEEP OUR BROCHURES ON HAND
- BEREAVED MOTHERS
WHY DONATE MILK?

• ALTRUISTIC REASONS – DONORS NOT PAID

• NOT WANTING TO WASTE MILK

• BABY CAN’T USE IT

• FETAL DEMISE * - NEED LACTATION COUNSELING
HOW TO BECOME A MILK DONOR

Mothers’ Milk Bank is a member of the Human Milk Banking Association of North America (HMBANA) and follows their strict guidelines and restrictions for screening donors.

Watch the video below to learn more about the milk donation process.

How to Donate Human Milk to Mothers’ Milk Bank
DONOR SCREENING

- PHONE – SUITABILITY, MEDS, EXPECTATIONS
- WRITTEN – BLOOD BANKING
- PHYSICIANS VERIFY HEALTH
- SERUM SCREENING
  - HIV 1&2
  - HTLV 1&2
  - HEP B, HEP C
  - SYPHILIS
  - * SEASONAL WNV & CHAGAS
  - SAFE!
DONATION AND OUTREACH CENTERS

- PARTNERS AT HEALTH CARE FACILITIES
- COLLECT MILK
- DONOR BLOOD DRAWS OPTIONAL
- DONOR REFERRALS
- 2016: 67 CENTERS, 25 IN CO 42 IN OTHER STATES
- NEEDED IN NM – ONLY 1 CURRENTLY!
THANK YOU DAR A LUZ!
DONATION AND OUTREACH CENTERS

• NEED A FREEZER
• A BIT OF TIME – RECEIVE AND SHIP MILK, DRAW BLOOD
• WILLINGNESS TO HELP
• MOMS LOVE RETURNING TO THE PLACE THEY DELIVERED BABY!
• KNOWING THAT YOU HELPED BABIES IN NEED
OUR PHILOSOPHY OF MILK PROCESSING

• INHERENT PERFECTION OF MILK
• STEWARDS OF THIS PRECIOUS MILK
• SAFETY/COMPLIANCE
• EVIDENCE BASED PROCESSES
• DO NO HARM
PASTEURIZATION

• 62.5 DEGREES C FOR 30 MINUTES
• REQUIRED BY GUIDELINES
• KILLS BACTERIA AND VIRUSES
• GENTLE HEATING PRESERVES MILK PROPERTIES
Pasteurization effect on milk

- Immunoglobulins
  - IgA - 77 to 100% activity remaining
  - IgG – 66-86%
  - IgM – lost
  - Lactoferrin 27 - 44%
  - Lysozyme – stable
  - Mucin complexes, antimicrobial activity, antiprotozoal all stable
  - Complement - destroyed

- Enzymes
  - 27 (protease) to 393 % (lysozyme) remaining
  - BSSL lost
Pasteurization effect on milk - con’t

- Vitamins A*, D, E - stable
- Vitamin C – lost in freezing
- Thiamin, Riboflavin, Niacin, Biotin, B-6, folic acid, pantothenic acid – stable
- Fat and fatty acids – stable
- Folate – 84%
- Growth factors – stable
- Protein - stable
POST PASTEURIZATION TESTING

1. BACTERIAL CULTURES
   - NO GROWTH IS ACCEPTABLE

2. MILK ANALYSIS
   - FAT
   - CALORIES
   - PROTEIN
   - CARBOHYDRATES

3. MILK TESTED FOR DRUGS OF ABUSE – COCAINE, OPIATES, PCP, AMPHETAMINES AND THC (COLORADO – IT’S LEGAL)
HISTORY OF DRUG TESTING AT MMB

- JANUARY 1ST, 2014: RECREATIONAL MARIJUANA IS LEGALIZED IN COLORADO (AMENDMENT 64)
- JULY 23RD, 2015: MMB BOARD OF DIRECTORS APPROVES IN-HOUSE TOXICOLOGY TESTING
- SEPTEMBER 2015: INITIAL VALIDATION TESTING BEGINS
- OCTOBER 2015: VALIDATION COMPLETE– ALL POOLS OF DONOR HUMAN MILK DISPENSED BY MMB UNDERGOES TESTING FOR
  - AMPHETAMINES
  - COCAINE
  - OPIATES
  - PCP
  - THC
• HMBANA GUIDELINES ON DRUGS:
  • CURRENT USE OF MARIJUANA FOR MEDICAL OR CASUAL USE IS UNACCEPTABLE
  • USE OF ILLEGAL DRUGS WITHIN THE PAST 12 MONTHS IS EXCLUSION CRITERIA

• PAPER WRITTEN USING DATA GATHERED FROM 2079 POOLS OF MILK OVER 13 MONTHS
• METHODS
  • USE OF ELISA TESTING
  • USE OF POSITIVE AND NEGATIVE CONTROLS FOR QA/QC
  • WHEN DONOR MOTHERS MILK IS TESTED: FIRST INDIVIDUALLY, THEN POOLED WITH OTHER MOTHERS AFTER NEGATIVE SCREENING
MILK TESTING FOR DRUGS OF ABUSE

• ALL TESTING VALUES FROM POOLS 3110 TO 5188 HAVE BEEN WITHIN ACCEPTABLE RANGES

• RESULTS FROM THE ELISA TEST ARE FOR SCREENING PURPOSES ONLY, AND ANY POSITIVE RESULTS WILL BE CONFIRMED USING GAS CHROMATOGRAPHY/MASS SPECTROMETRY AT AN OFFSITE LABORATORY

• THIS TESTING HAS BEEN IMPLEMENTED AT MMB OF NORTH TEXAS, WHERE WE TESTED KNOWN POSITIVES QUARANTINED FROM THEIR MILK SUPPLY. THE TESTING CAME UP POSITIVE, CONFIRMING ITS EFFICACY.
TYPES OF MILK AVAILABLE

• HOSPITAL MILK - > 20 CAL, 1G PROTEIN
• PRETERM MILK *
• EARLY FULL TERM*
• NON DAIRY *
• NON FAT

• *LIMITED AVAILABILITY
RECIPIENTS

• PRETERM INFANTS, HOSPITALIZED

• OTHER HOSPITALIZED INFANTS

• FULL TERM INFANTS AFTER BIRTH

• OUTPATIENTS: OLDER PREEMIES, FEEDING DIFFICULTIES AND OTHER MEDICAL CONDITIONS
SHIPPING
INDICATIONS FOR DONOR MILK USE IN THE HOSPITAL

- BEING BORN
- MOM’S OWN MILK NOT AVAILABLE
WHY DONOR MILK IN THE HOSPITAL?

• NATIONALLY, ONLY 25% OF MOTHERS PROVIDE SUFFICIENT MILK FOR THEIR BABIES THROUGH DISCHARGE FROM THE HOSPITAL
SOME USES OF DONOR MILK IN THE HOSPITAL

- Trophic feeds before mom available
- Supplement to mom
- When mom not pumping (medical/social issues) adoption or surrogacy
- Feeding intolerance/GI problems
- Short gut/Post NEC
- Hypoglycemia
- Jaundice
- Immune problems
- Failure to thrive
- Retinopathy of prematurity
NEC

• NECROTIZING ENTEROCOLITIS (NEC) IS A SERIOUS INTESTINAL ILLNESS IN BABIES.
• "NECROTIZING" MEANS DAMAGE AND DEATH OF CELLS
• "ENTERO" REFERS TO THE INTESTINE
• "COLITIS" MEANS INFLAMMATION OF THE COLON (LOWER PART OF THE INTESTINE)
WHY NEC IS CONCERNING

• PERFORATION (HOLE) IN THE INTESTINE
• SCARRING OR STRICTURES (NARROWING) OF THE INTESTINE
• PROBLEMS WITH FOOD ABSORPTION IF LARGE AMOUNTS OF INTESTINE MUST BE REMOVED
• SEVERE, OVERWHELMING INFECTION
NEC
NECROTIZING ENTEROCOLITIS
EVIDENCE FOR HUMAN MILK PREVENTION OF NEC


DONOR HUMAN MILK AND NEC

• MCGUIRE: “INFANTS WHO RECEIVED DONOR HUMAN MILK WERE THREE TIMES LESS LIKELY TO DEVELOP NEC AND FOUR TIMES LESS LIKELY TO HAVE CONFIRMED NEC THAN INFANTS WHO RECEIVED FORMULA MILK.”

• COCHRANE REVIEW 2013 - In preterm and low birth weight infants, feeding with formula compared with donor breast milk results in a higher risk of developing necrotising enterocolitis.
THE JOINT COMMISSION: EXCLUSIVE BREAST MILK FEEDING

2013

PERINATAL CORE MEASURE SET:

**EXCLUSIVE** BREAST MILK FEEDING; INCLUDES MOTHER’S OWN MILK AND DONOR MILK.
OUT-PATIENT USE

• MANY HOSPITALS GIVE 1 OR 2 BOTTLES TO BABY UPON DISCHARGE
• AT HOME: RX NEEDED
• FAMILY WORKS DIRECTLY WITH MILK BANK
• FAMILY PAYS TISSUE PROCESSING FEES (INSURANCE) BABY WITH MEDICAL NECESSITY – FINANCIAL AID MAY BE AVAILABLE
• CURRENT PROCESSING FEE: $4/OUNCE PLUS SHIPPING
• INSURANCE ?
OUTPATIENT RECIPIENTS

• LILLIAN - AT 4 ½ MONTHS OF AGE MOM WAS LIFTING HER BABY UP IN THE AIR AND WITH BABY’S MOUTH WIDE OPEN IN A LAUGH, MOM SPOTTED A MARBLE SIZE LUMP AT THE JUNCTION OF THE BABY’S HARD AND SOFT PALATE.

• BECAME UNABLE TO NURSE, SURGERY, WEIGHT LOSS, MOM’S OWN MILK SUPPLY DOWN

• DHM FOR 4 MONTHS DURING SURGERY, RECOVERY
MMB CHARITY CARE PROGRAM

• DEMONSTRATED MEDICAL NEED IN THE INFANT, FORMULA INTOLERANCE

• DOCUMENTED FINANCIAL NEED FAMILY
THE END OR MAYBE JUST THE BEGINNING
REFERENCES


REFERENCES


• SCHANLER RJ, LAU C, HURST NM, SMITH EO. RANDOMIZED TRIAL OF DONOR HUMAN MILK VERSUS PRETERM FORMULA AS SUBSTITUTES FOR MOTHERS’ OWN MILK IN THE FEEDING OF EXTREMELY PREMATURE INFANTS. PEDIATRICS. 2005 AUG; 116(2):400-6.

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QUESTIONS