

# FORMULA AND FOOD ALLERGIES



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# CLASSIFICATION OF FORMULA ACCORDING TO PROTEIN

## ☐ Intact protein

- CMP Based
- Soy based
- Goat milk based
- rice based

## ☐ Partially hydrolyzed ( whey or casein )

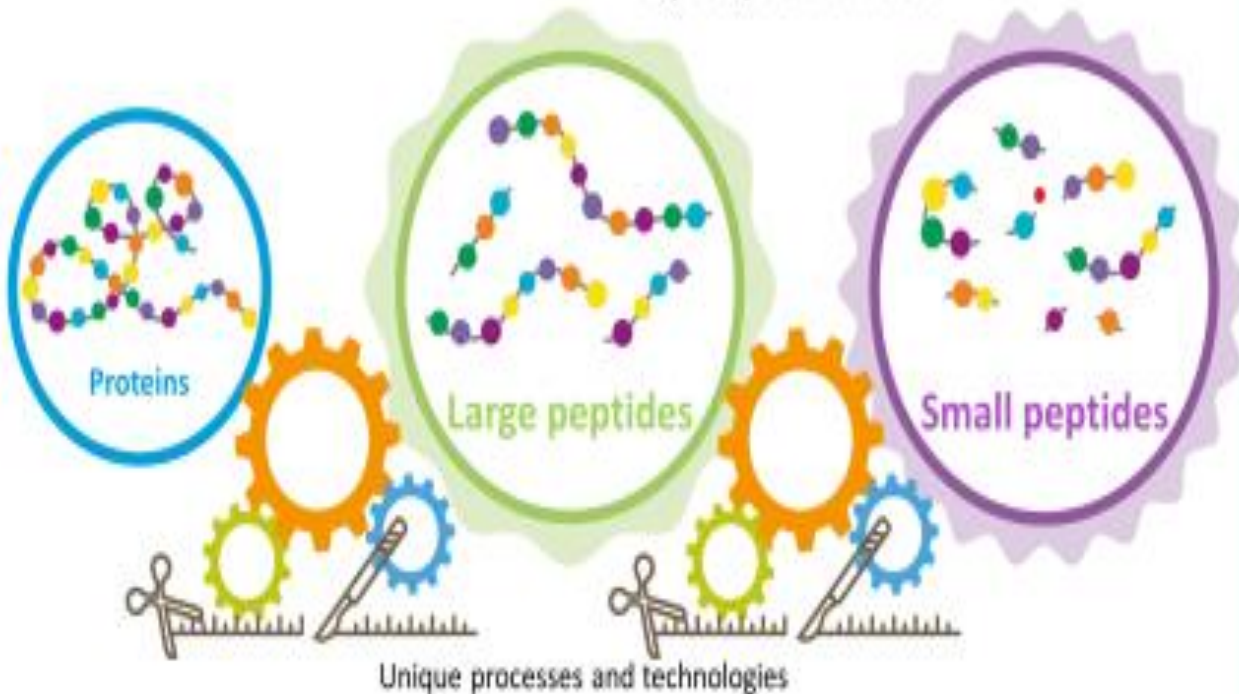
## ☐ Extensive hydrolyzed ( whey or casein )

## ☐ Amino acid Based

Standard  
and  
specialty  
infant  
formulas

Cow's milk-based

Hydrolysed formulas



Intact cow's milk proteins

Partially hydrolysed

Extensively hydrolysed

Amino acid-based

Atopic dermatitis  
risk reduction

**Management** of cow's milk protein allergy  
or severe food allergy

# MAIN ALLERGENS IN COW'S MILK

- ❖ The main allergens in cow's milk are whey proteins ( $\alpha$ -lactalbumin,  $\beta$ -lactoglobulin, bovine serum albumin, and bovine immunoglobulins) and casein proteins ( $\alpha$ -s1,  $\alpha$ -s2,  $\beta$ -casein,  $\kappa$ -casein)

# SELECTING FORMULA ALTERNATIVES

Symptom severity, age of the infant, patient preference, cost, and efficacy should be considered when selecting a formula alternative .

- ❖ **Three types of formula (soy, extensively hydrolysed protein and amino acid) are available for infants with CMPA**
- ❖ **Alternative mammalian milk formula such as goats' milk-based, lactose-free and partially hydrolysed formula are not suitable for CMPA .**

# PARTIALLY HYDROLYZED FORMULA



# PARTIALLY HYDROLYZED FORMULA ( WHEY OR CASEIN )

Milk protein was broken into small peptide ( 3-10 Kda)

partially hydrolyzed cow's milk formula should not be used to treat CMA, as **cross-reactivity** has been demonstrated in roughly **50%** of infants with CMA.

It is used to prevent allergic disease ,such as atopic dermatitis , in high risk formula fed infant with family history of allergies .

**There is no evidence to support administration of hydrolyzed formula (HF) in preference to exclusive breastfeeding to prevent allergy.**

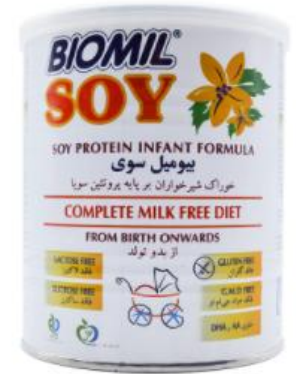
This formula has lactose . Thus , it can **not be used for lactose intolerance and galactosemia .**



# SOY BASED FORMULA

Soy formula, although reported to **cause reaction in 10% to 14% of infants with CMA**, is more palatable and more affordable than extensively hydrolyzed formula.

Guidelines from the ESPGHAN and the WAO **recommend against** soy formula in infants **younger than 6 months of age** with CMA because of cross-reactivity, but soy formula might be recommended for IgE-mediated CMA after 6 months of age.





# SOY BASED FORMULA

Hydrolyzed soy formula was also found to be hypoallergenic and should be considered.



# SOY BASED FORMULA

Soy-based formula limitations are the unknown effects of phytate and phytoestrogens found in soy and cross-reactivity with CMA, especially in younger infants.

Soy formulas have been shown to promote appropriate infant growth patterns, but some studies suggest lower weight gain in infants fed soy formula compared to cow's milk formula.

# EXTENSIVELY HYDROLYZED FORMULA

- Extensively hydrolyzed formula contains no peptides with a molecular weight greater than 5000 Da
- Extensively hydrolyzed cow's milk formula is recommended as first-line treatment for CMA in infants by the ESPGHAN and the WAO.
- more than 90% of children with CMA will tolerate it.

# EXTENSIVELY HYDROLYZED FORMULA

- Extensively caseine hydrolysed contains no whey protein
- **Pregestimil, Nutramigen, Alimentum**
- Extensively whey hydrolysed contains no caseine
- **Aptamil pepti, Aptamil pepti junior**

# Alimentum

Hydrolyzed casein supplemented with free amino acids  
,DHA and AA

of the fat as MCT 33% Approximately

Lactose-free carbohydrate for lactose sensitivity

Gluten-free



# Pregestimil

Hydrolyzed casein protein •

lactose and sucrose free •

of fat from MCT Oil %55 •

DHA and AA •



# Nutramigen

Extensively casein hydrolysed •

No MCT •

(corn starch 20% glucose syrup, 80% Lactose-free ( •



# EXTENSIVELY HYDROLYZED FORMULA (whey hydrolyzed )

Extensively hydrolyzed whey protein

No MCT

DHA and AA

Lactose 40%, maltodextrin 60%

Prebiotic added



# **EXTENSIVELY HYDROLYZED FORMULA** ( whey hydrolyzed )

**Extensively whey hydrolyzed formula**

- 80-90% short chain peptides
- 10-20% free amino acids

**DHA and AA**

**MCT 50 % of lipid content**

**No lactose, 100% glucose syrup**

**With superior palatability**





# AMINO ACID BASED FORMULAS

indicated in cases where infants are **unable to tolerate extensively hydrolyzed** hypoallergenic formulas (eg, cow's milk or soy milk), in severe allergy to milk such as food protein–induced enterocolitis syndrome and in infants who have **anaphylactic reactions** to cow's milk protein.

Use of amino acid–based formula demonstrated nutritional adequacy in growth patterns of infants with CMA (tolerance of 100%).

The main drawbacks are **increased cost** (6 to 8 times more expensive than extensively hydrolyzed formula) and **poor palatability** because of the elemental form, resulting in refusal by some infants.

# AMINO ACID BASED FORMULAS

**Neocate:** lactose free, glucose syrup, little MCT(5%)  
Contains DHA and AA

**Elecare** :contain DHA/ARA .lactose free ,Corn Syrup Solids (55%) .Medium-Chain Triglycerides (8%).

**Comidagen:** soy based . lactose free, 100% maltodextrin, no MCT. Contains Alf:DHA and AA



# AMINO ACID BASED FORMULAS

- ❖ If symptoms do not improve with amino acid–based formula, the diagnosis is likely not CMA.

