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For Life is Precious

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Lab to Tab™

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A HiMedia Newsletter

HiMediaLaboratories™ Newsletter Volume - 6 | December 2017

# Message from CEO

Dear Friends,

**First, let me accord you a warm welcome to browse through our "Lab to Tab™" published in this winter, December 2017. We live at remarkably fascinating times whence new frontiers are opening up for mankind.**

### Peptones, Protein Hydrolysates

Proteins are the building blocks for all life, hydrolysing them and breaking them into tiny bits that become palatable as well as delectable is an art bordering on to culinary expertise. My team has mastered this art of hydrolysing proteins in combinations, using exquisite combos of enzymes. Role of peptides in various areas and in our day to day life cannot be underestimated. Various teams are working on these lines, and HiMedia are proud to be working in tandem. Our pioneering efforts at giving you 100% vegetable based peptones, and subsequently 1500 animal free culture media, underlines our commitment to a sustainable planet.

### Biosimilar, Another Protein Based Product

HiMedia ventured into the Biosimilar arena to exponentially bring down the costs of monoclonal antibody therapy. Our aim is to provide high quality tailor made media and feed to support synthesis of the desired Biosimilar at an affordable cost. This would augment the patient's affordability index geometrically especially in the area of cancer biological therapy, helping patients across national boundaries, making the world a better place to live. Truly, the Biosimilars revolution will soon be engulfing the whole of the globe, sooner that we would like to admit. The research work in this area not only challenging but also involves costly capex investment. HiMedia is well geared to overcome this challenge.

My research teams are untiringly working on these challenges today, so that the dream of Biologic Drugs is made a reality for the common man. With your support we are sure to win this battle.

### Food Adulteration

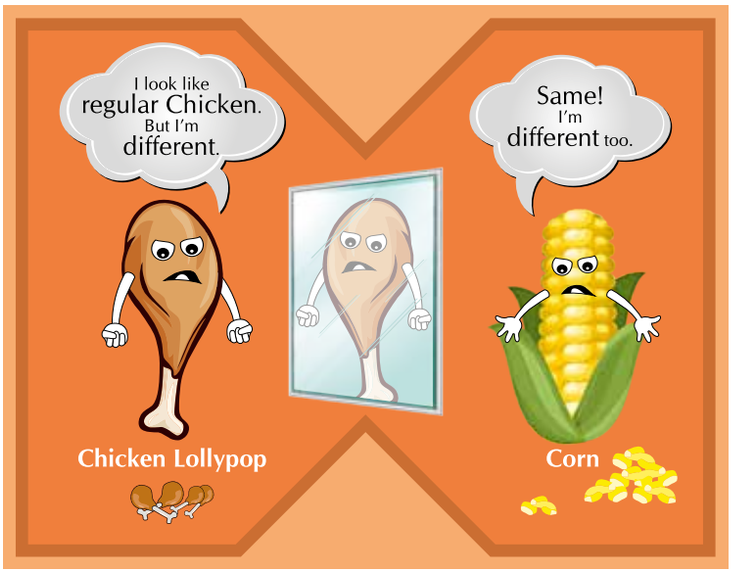
The monster of food adulteration is as old as humanity, and its insatiable greed. Many have fallen fighting this monster, and many have lost their vigor due to its stealthy attacks. Advances in real time PCR assays, today are leaving this monster no space to hide its face. The 'pork in beef' adulteration detection kit, for instance, can now detect even 0.1%, and the same is true for genetically modified adulterants. However, this forces all of us to be vigilant all the time. Our teams have empowered you with several options for combat readiness.

Our 42 years' expertise in BioSciences empowers you to play a positive role in sustaining the Spaceship Earth. Ours is the only planet known to have life in our known universe. Let us safeguard it and work towards improving the quality of life on Planet Earth, as "Life is Precious".

Enjoy more about these in the articles ahead and write to us at info@himedialabs.com or techhelp@himedialabs.com

# LOOKS LIKE CHICKEN AND CORN. BUT IS IT FOR REAL?

***Food adulteration and its impact on our ecosystem.***




Food adulteration is an issue faced by the modern society. Two types of food adulteration have raised various problems in modern times :

1. GMO (Genetically Modified Organism) without declaration.
2. Contamination of declared meat with another local source of cheaper meat variant.

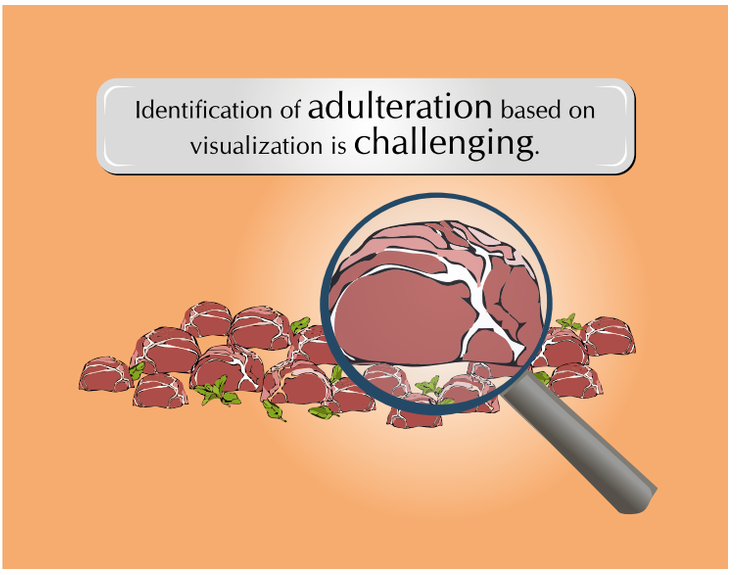
GMOs are crops whose genetic material is altered using molecular techniques. Genetic alteration gives the crop the resistance required against climatic conditions or pest or increases its nutritional value and are therefore commercially lucrative as food produce. GMOs are a boon to the society but its consumption raises various questions regarding its long-term effects. The production of GMO also adversely affects biodiversity.



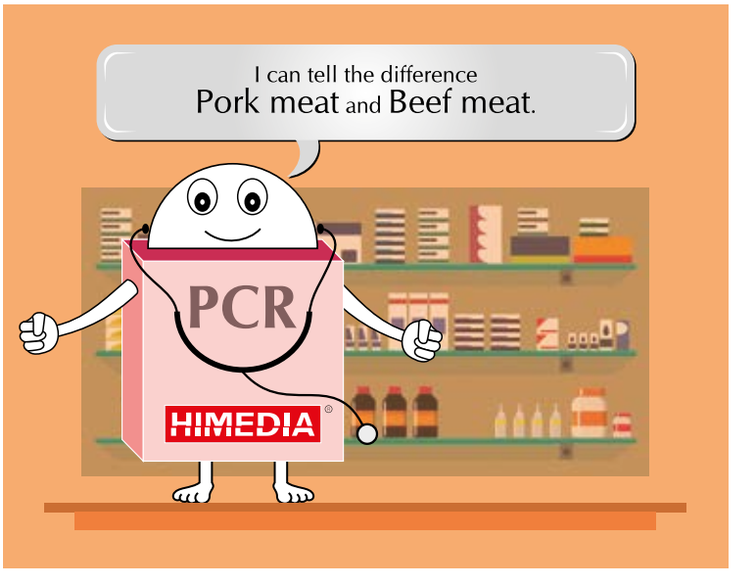
Meat adulteration on the other hand is a practice to increase the weight of the end product i.e. meat. Some industry traders import meat such as pork meat and re-label them as Halal Approved. Consuming such food can hurt religious or ethical sentiments. People with allergies and intolerance can fall prey as the unspecified meat in the mentioned meat product can trigger food allergy. Such an instance can also be a threat to a company's reputation and brand loyalty.

This is because the adulterants in above mentioned cases finely vary in appearance eg. Pork meat and Sheep meat. The only way to ensure authenticity of food products is to have regular check on the suppliers. However, this is one of the most difficult tasks to perform. Various methods can be used for detection of adulterants based on:

1. Protein such as ELISA, liquid chromatography (LC).
2. Nucleic Acids (hybridization, polymerase Chain reaction (PCR), single strand conformational analysis, RFLP).




Among these techniques, Nucleic acid sequence based amplification (NASBA) also known as Polymeric Chain Reactions (PCR) not only differentiates between two species but also between individuals of the same species. In addition, it is the most sensitive and specific diagnostic test available today. Among PCR assays, Quantitative PCR or Real Time PCR (qPCR) are preferred because it can detect and quantitatively measure the amplification as the reaction progresses.



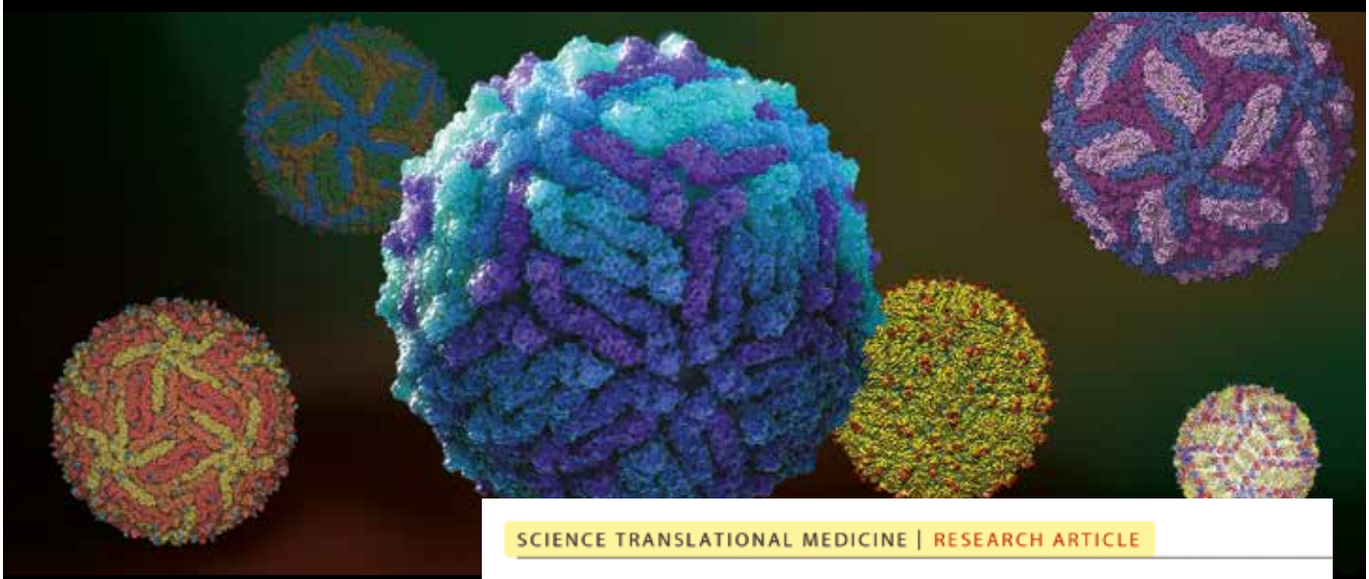

After years of dedicated scientific research, HiMedia Laboratories Pvt. Ltd. has developed kits based on PCR assays to facilitate detection of GMO and meat adulteration. Our kits can detect even a single foreign molecule of nucleic acid present in samples. Thus, enabling to differentiate the genetically modified food product.

For eg. Identification of GMO grain from wild type grain.

Similarly, the meat adulteration kits help to differentiate between closely related species. For example, HiMedia's Pork in beef meat adulteration kit can detect even 0.1% of pork meat present in beef. The PCR based techniques are rapid, specific and most sensitive. These kits are the method of choice for precise identification of such adulterants. HiMedia is continuously doing Research and development to deliver solutions to ensure the authenticity of Food Products.


1. Book- Biotechnology by U Satyanarayan
2. http://alternation.ukzn.ac.za/Files/docs/20.8/06%20Raf.pdf
3. https://www.thesouthafrican.com/meat-company-tells-porkies-in-halal-scandal/
4. https://www.researchgate.net/publication/262725713_Biotechnology_in_society_-Boon_or_Bane_A_Case_Study
5. http://www6.appliedbiosystems.com/support/tutorials/pdf/rtpcr_vs_tradpcr.pdf

# Science Translational Medicine



SCIENCE TRANSLATIONAL MEDICINE | RESEARCH ARTICLE

INFECTIOUS DISEASE

## Rapid antigen tests for dengue virus serotypes and Zika virus in patient serum

Irene Bosch, [1,2]* Helena de Puig, [1,3]* Megan Hiley, [1] Marc Carré-Camps, [1,4] Federico Perdomo-Celis, [5] Carlos F. Narváez, [5] Doris M. Salgado, [5] Dewahar Senthoor, [1] Madeline O 'Grady, [1] Elizabeth Phillips, [1] Ann Durbin, [1,6] Diana Fandos, [1,4] Hikaru Miyazaki, [1] Chun-Wan Yen, [1] Margarita Gélvez-Ramírez, [7] Rajas V. Warke, [8] Lucas S. Ribeiro, [9] Mauro M. Teixeira, [9] Roque P. Almeida, [10] José E. Muñóz-Medina, [11] Juan E. Ludert, [12] Mauricio L. Nogueira, [13] Tatiana E. Colombo, [13] Ana C. B. Terzian, [13] Patricia T. Bozza, [14] Andrea S. Calheiros, [14] Yasmine R. Vieira, [15] Giselle Barbosa-Lima, [15] Alexandre Vizzoni, [15] José Cerbino-Neto, [15] Fernando A. Bozza, [15,16] Thiago M. L. Souza, [14,17] Monique R. O. Trugilho, [18] Ana M. B. de Filippis, [19] Patricia C. de Sequeira, [19] Ernesto T. A. Marques, [20,21] Tereza Magalhaes, [20,22] Francisco J. Díaz, [23] Berta N. Restrepo, [24] Katerine Marín, [24] Salim Mattar, [25] Daniel Olson, [26] Edwin J. Asturias, [26] Mark Lucera, [27] Mohit Singla, [28] Guruprasad R. Medigeshi, [29] Norma de Bosch, [30] Justina Tam, [1,31] Jose Gómez-Márquez, [1] Charles Clavet, [31] Luis Villar, [7] Kimberly Hamad-Schifferli, [3,32†] Lee Gehrke [1,33†]

The recent Zika virus (ZIKV) outbreak demonstrates that cost-effective clinical diagnostics are urgently needed to

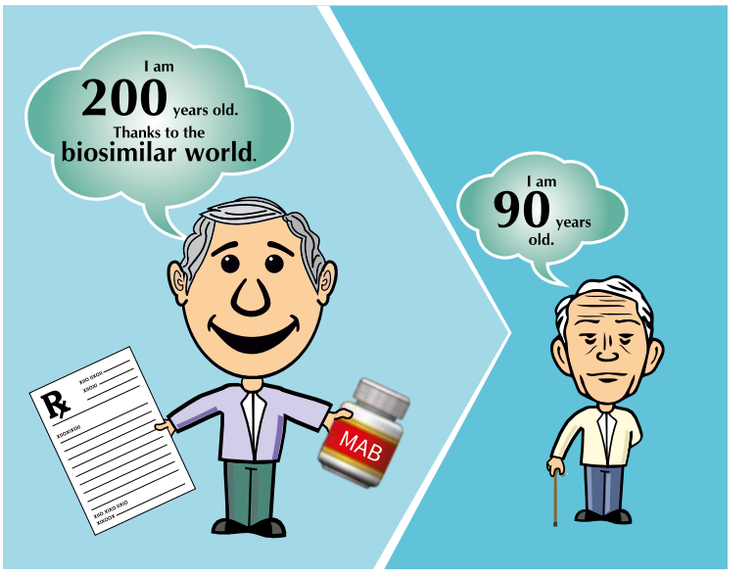
For more info visit -

- http://stm.sciencemag.org/content/9/409/eaan1589
- https://www.telegraphindia.com/1170928/jsp/foreign/story_175311.jsp

Patent No. 274645 has been granted by Patent Office of Government of India in August 2016 for

**"Process for Preparation of Chromogen Disc".**

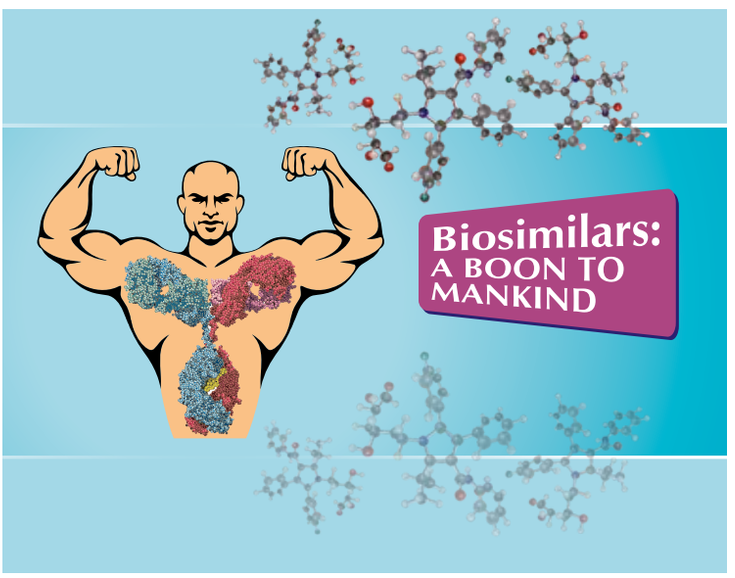
# The Biopic of the Biologic Dream, to the Biosimilar Reality.




Biologic drugs have always been known to defy ageing, cancers and death since last few decades. Partial success has been achieved for selected patients who could afford super expensive therapies. In coming years, biosimilar world is likely to open up for common man, raising hopes of longevity dream by prolonging ageing and defying diseases. The dream, if achieved, would be a bigger step than first human step ventured into space, for it will mean defiance of human race against cancers and debilitating diseases.

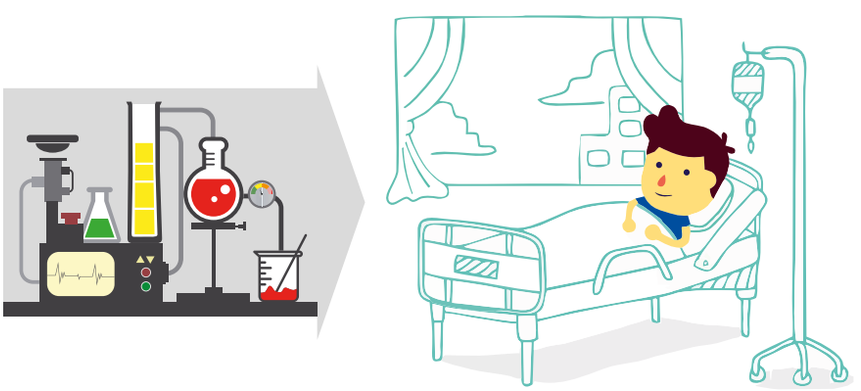
https://www.youtube.com/watch?v=zjbuvmRVGO8

Biosimilar are officially approved version of original innovator biologic drugs but available at lower cost for patients, after patent of innovator drug has expired. Making a Biosimilar is very complicated task mainly because of un-availability of original innovator clone. Biggest hurdle is high costs involved in customized media production for biosimilar clone, extraordinary cost of conducting chemical characterization studies and efforts to ensure safety.



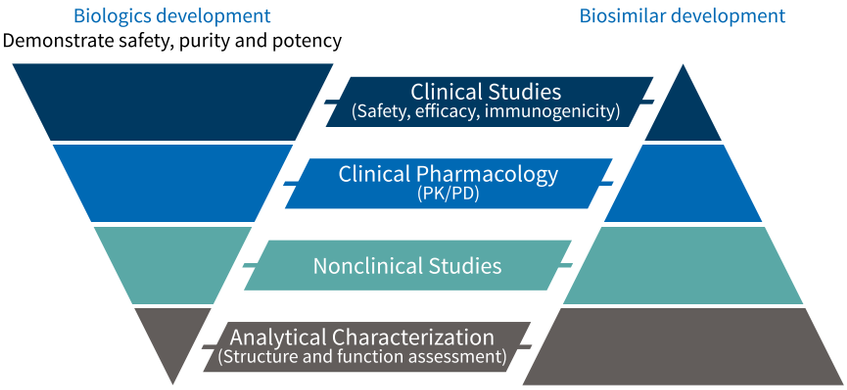

**Investigation of several Biosimilars with original innovator Biologics :**

Biosimilars have long chain of modified amino acids, with complex glycosylation folding patterns. In order to be safe, biosimilar must be shown to be closest to the innovator biologic product.



**From Bench to Bedside :**

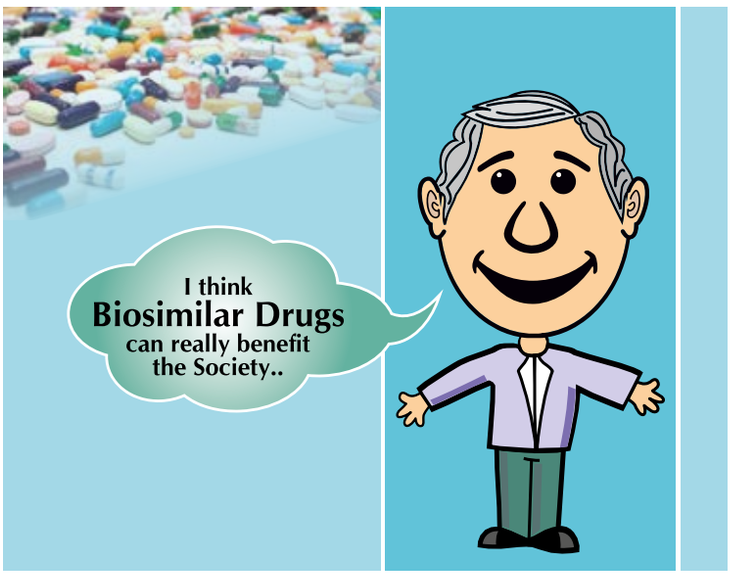
Todays research on lab benches would mean medicine for patients on bed side to live longer.




**Therapeutic Biosimilars :**

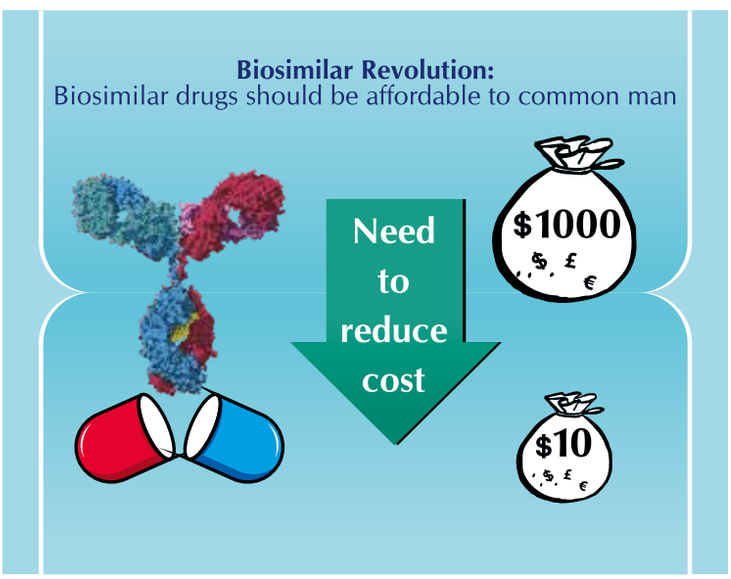
Biosimilars would have therapeutic applications in

- ✓ Targeting Cancers and melanomas
- ✓ Infectious diseases
- ✓ Autoimmune dysfunction
- ✓ Eye degeneration
- ✓ Osteoporosis
- ✓ Arthiritis
- ✓ Neurodegenerative disorders
- ✓ Transplant rejections




**Common man's needs of Biologics/ biosimilar drugs :**

By 2030, cancer cases are expected to rise by 70% in India. Patients, diagnosed with breast cancer, can be treated quite effectively with Herceptin (Biologic monoclonal antibody), a drug manufactured by Roche which has the reputation of a 'wonder-drug' in the field of cancer, not only for its targeted action against cancer cells but also for lack of side-effects – lack of hair loss! However, Herceptin is very expensive drug, costing around Rs.20 lacs per patient/year. The estimated revenues of Roche from worldwide sales of Herceptin are $4 billion dollars. Herceptin is not yet patented in India. You would think that without a patent and a promise of huge profits for a generic version, Indian pharmaceutical companies would be lining up to mass-produce Herceptin. Do you know how many generic versions of Herceptin are available in the market? None! This is despite the fact that technology has existed for two decades.




**Biosimilar Revolution :** Biologics are also very expensive, which is why scientists/clinicians/ Experts imagine a "Biosimilar revolution" similar to French revolution enveloping globe to push prices down for life extending Biosimilar therapeutics.

https://www.youtube.com/watch?v=MGpwR4PnWYk

Pricing of Biosimilars is mainly driven by very high cost of media, which is irrational yearning for huge profits. Some media developers are expressing intentions to low-ball their prices. Others are interested in protecting their product portfolios. Top 6 big sellers drugs are monoclonal antibody based therapeutics, and these Biosimilar versions are expected to rule market in coming 5 years. The Biosimilars is fastest growing industries globally, because many blockbuster biologics will reach patent expiration in the next 2 years. By the end of 2020, more than 30 innovator biologics with global sales of over $100 billion will have lost patent protection.

| Biologics included in Express Scripts' 10-Year Savings Model | | | | | | |
|---|---|---|---|---|---|---|
| **Brand** | **Generic** | **Manufacture** | **Approval** | **Patent Exp** | **US 2012 Sales (in thousands)** | **CA 2012 Estimated Sales (in thousands)** |
| Avastin | bevacizumab | Genentech | 02/06/2004 | 06/18/2019 | $2,666,842 | $292,912,62 |
| Epogen | eopetin alfa | Amgen | 06/01/1989 | 05/26/2015 | $2.254.245 | $247.966.95 |
| Herceptin | trastuzumab | Genentech | 09/25/1998 | 08/27/2019 | $4,505,380 | $495,591.80 |
| Humira | adalimumab | AbbVie | 12/31/2002 | 12/31/2016 | $4,505,380 | $495,591.80 |
| IntronA | Interferon alfa-2a | Merck | 06/04/1986 | 08/26/2020 | $94,009 | $10,340.99 |
| Neulasta | pegfilgrastim | Amgen | 01/31/2002 | 10/20/2015 | $3.472,988 | $382,028.68 |
| Neupogen | Filgrastim | Amgen | 02/20/1991 | 11/10/2013 | $1,007,172 | $110,788.92 |
| PEG-Intron | Peginerferon alfa-2b | Merck | 01/19/2001 | 08/26/2020 | $121,828 | $13,401.08 |
| Procrit | eopetin alfa | Janssen Products | 06/01/1989 | 05/26/2015 | $1,127,024 | $123,972.64 |
| Remicade | infliximab | Janssen Biotech | 08/24/1998 | 09/04/2018 | $3,796,422 | $417,606.42 |
| Rituxzn | rituximab | Genentech | 11/26/1997 | 07/05/2015 | $3,183,625 | $350,198.75 |

**Role of HiMedia in driving Biosimilar revolution :** HiMedia has capabilities to provide tailor made media for biosimilar developments. HiMedia is developing Serum Free, Chemically defined media for the Biosimilar Industry in India. HiMedia customers have reported SFM HiMedia to be more robust and giving better result as compared to high cost media from competitor companies. At HiMedia, we believe, that it is very imperative that very good quality, low cost media should be made available to Biosimilar industry so that the costs of the Monoclonal Antibodies based therapies can be brought down exponentially. HiMedia's stepped into the Biosimilar market with the aim of providing high quality media for Biosimilars, to thrust Biosimilar revolution, thus helping patients across national boundaries, and for making world a better place to live as one-world.

# FACTORY EVENTS

## Health and Safety at work

Blood Donation Camp

Women's Day

DINDORI PLANT

Yoga Day

Diwali Celebration at Adhar Ashram

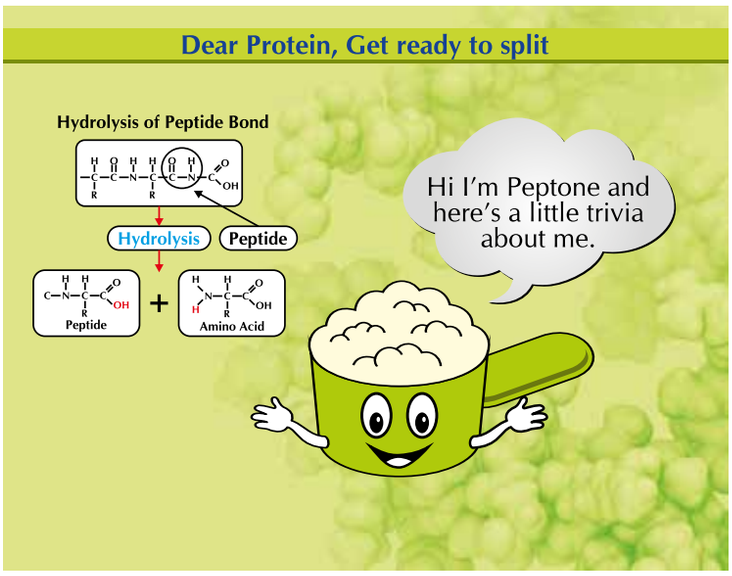
## Safety Day

# Protein Hydrolysates (Peptones)

Dr. Ela Sharan

## Promising nutrient for good health of all living beings

### Peptones : Basic concept and History




Protein hydrolysates universally known as "Peptones", are mixture of amino acids, dipeptides, tripeptides and other amino acid. These tiny bits of intact protein are obtained by splitting or hydrolyzing a protein with acids, alkalis, heat or proteolytic enzymes. These hydrolyzed components are absorbed more rapidly and easily than intact protein, thus maximizing nutrient delivery to the cells at a faster rate. When the shuttles are faster, more aminos reach your cells and muscles leading to better gains.

**Molecular structure of Protein and peptide bond**

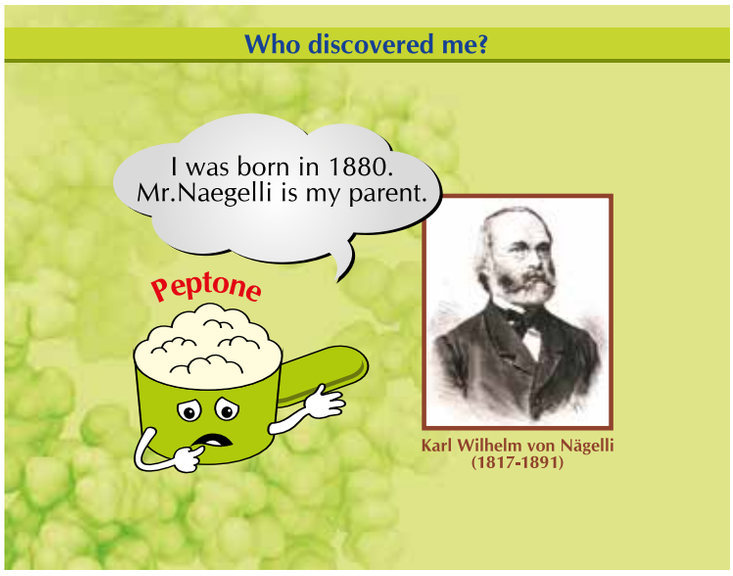

**Basic manufacturing steps of protein hydrolysates**

The term "Peptone" was first coined in 1880 by Naegelli for cultivating and nurturing bacterial cultures. However, later it was revealed that peptones derived from hydrolysis of proteins would supply organic nitrogen in readily available form. Ever since, peptones or protein hydrolysates, are being used as source of nitrogen, precursors, cell mass builders, and metabolite inducers in fermentation, and for the manufacture of value added products such as therapeutic proteins, hormones, vaccines, antibiotics, vitamins and other biomolecules from recombinant microorganisms.

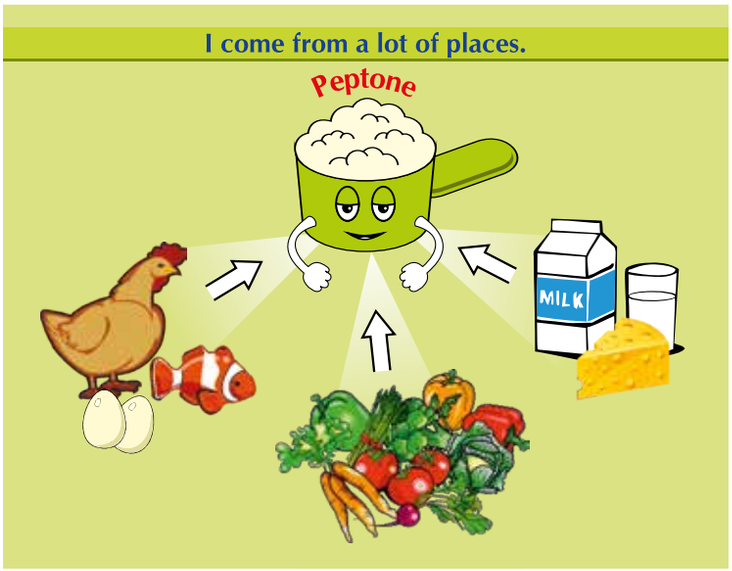
### Salient features of peptones :

The major physico-chemical properties of protein hydrolysates are determined by

- Initial substrate used for hydrolysis.
- Amino acid composition of initial substrate.
- Biological and nutritive efficiency.
- Mode of conversion initial substrate to a mixture of monomers and oligomers.
- Conversion efficiency.
- Purification method.



Certain functional properties of protein hydrolysates like solubility, heat stability and emulsification properties are more important than others that determine the choice of specific hydrolysates for practical applications.




Enzymatic hydrolysis yields good quality protein hydrolysates compared to acids or alkali hydrolysis process, as they are target specific and destruction of other amino acids is minimal.

**From where do we get these?**

Protein hydrolysates are obtained from numerous sources such as animal tissues, milk and plants. Some traditional key protein sources, including milk, fish, meat, beef, pork, collagen, egg, pea, soy bean, rice and potato are being used for the preparation of protein hydrolysates. Single cell proteins are also considered as consistent source for preparation of protein hydrolysates.

## What are their different roles and applications?

### Protein hydrolysates have a wide role in biological systems

- **Biomolecules :** Being major biomolecule, units of protein are main building blocks of structural components of cells and hence eventually entire body of living organisms. As in secretary process, proteins and their units (enzymes and hormones) are involved in the maintenance and metabolic activities of living organisms. (https://www.youtube.com/watch?v=EQGlKZ2EA70)

- **Microbiology :** Peptones are excellent natural sources of amino acids for reproducible growth of microbial cultures hence they are serving as major ingredient in microbiological culture media for growth of specialized bacteria and fungi satisfying their specific nutritional demand.

- **Fermentation Industry :** Peptones are used in fermentation media for biomass cultivation, manufacture of antibiotics, secondary metabolites, toxin production, vaccines and hormones.

- **Fitness and Peptones :** Glycogen replenishment is driven by insulin, which is robustly stimulated in the presence of carbohydrates, but also stimulated in the presence of protein alone. Protein hydrolysate induces a substantially greater insulin response compared to intact proteins, which facilitates superior glycogen replenishment and a greater anabolic response when consumed post-workout. Hence tiny bits of protein have become popular ingredients in sports nutrition. Due to the low (or zero) amounts of carbohydrates and sugars in hydrolyzed protein, they are very advantageous for those looking to maximize muscle gains while reducing fatty tissue (weight loss).

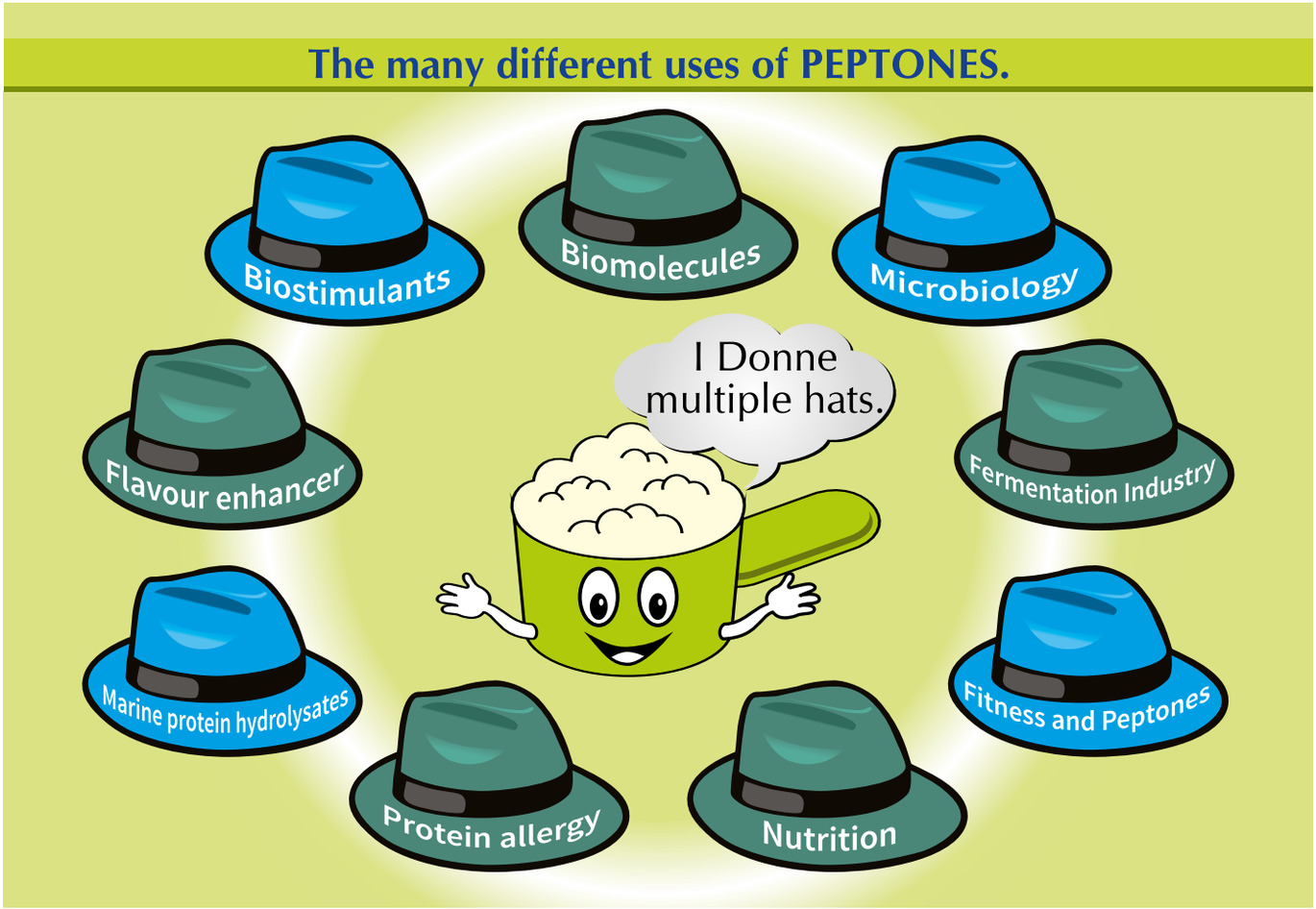
- **Nutrition :** Extensive use as dietary proteins for human and animal nutrition and/or fractions thereof in feed and food.

- **Protein Allergy :** An adverse immune reaction to intact proteins present in food specially in milk which is not tolerated by infants. Protein hydrolysates can modify the allergenic properties of infant formula which ensures that baby's immune system barely recognizes an allergic threat.

- **Marine Protein Hydrolysates** Fractionated peptides from various marine animals especially fishes have good curative effects in various diseases including amnesia, insomnia, dizziness, anepithymia, and weakness. They are also called as antioxidant, anti-fatigue and antihypertensive peptides. High-intensity exercise often destroys the balance between the oxidation system and anti-oxidation system of human body. Exogenous dietary peptides decrease exercise-induced oxidative stress and improve the physiological condition. Marine protein hydrolysates have become popular in food industry due to high protein content and are used as growth stimulating agents in feed of farmed animals.

- **Flavour Enhancer :** Hydrolyzed vegetable protein particularly hydrolyzed soy protein and hydrolyzed yeast, are used as a flavor enhancers to round off the taste of soups, sauces, meat products, snacks as well as for the making of ready-to-cook soups and bouillons.

- **Biostimulants :** Protein hydrolysates in horticulture are able to enhance crop quality parameters nutrient efficiency and combat abiotic stress tolerance.



## Peptones and HiMedia :

- The golden era of Microbiology commenced in 1857 with the work of Louis Pasteur and flourished during a period of about 60 years and is still continuing. During these years, various divisions of microbiology were established and the foundations were laid that has led to modern microbiology. Bacteriologist Robert Koch and J. Schroeter and mycologist A. de Bary and O. Brefeld pioneered pure culture techniques for bacteria and fungi on solid media.
- Naegeli was the first to explain use of peptones (the digested protein as nitrogen source) for cultivation and maintenance of bacteria. These studies encouraged use of various animal tissue extracts and their proteins in culture media that resulted in production of growth promoting peptones.
- Over the years many new and improved culture media formulations have been developed which includes theses animal tissue based peptones and infusions. The development of superior culture media for isolation and cultivation of pathogenic and non-pathogenic bacteria from various specimens still continues to be a major objective of microbiology. Scientists at HiMedia Laboratories Pvt. Ltd. efficiently working on these objectives to supply high quality media and ingredients like peptones.
- HiMedia as a strong believer of eco-friendly approach and being always a follower of cutting edge research products, they were the first ones who took up the challenge of developing 100% vegetable based peptone so that no animal is sacrificed for animal based peptone productions. HiMedia had successfully introduced the green revolution in peptones by introducing HiVeg peptones and culture media products in 2003. As an alternate to regulatory constraints, veg substitutes are gaining high attention and have evoked the transition phase. This breakthrough innovation has the ability to reduce the carbon footprint load emitted during the making of animal based peptones.
- Thus widest range of HiVeg peptones are made from major sources of grains/vegetables like wheat, soya, rice, pea, maize and corn is made available to microbiology fraternity that were standardized against corresponding animal based peptones and are cost effective. (HiMedia's Veg peptones chart) (www.hiveg.com).
- HiMedia hopes to continue introducing more and more media based on R&D work as per the changing and challenging demands of a global market.

## Future scope of this peptone area :

In addition to these features, Peptone are receiving fame in molecular biology for quite a few reasons. Peptides allow the formation of peptide antibodies in animals without the need of purifying the proteins. This includes synthesizing antigenic peptides of sections of the protein of interest. These will then be used to make antibodies in a rabbit or mouse against the protein. Another reason is that peptides have become instrumental in mass spectrometry, allowing the documentation/identification of proteins of interest based on peptide masses and sequence. Peptides have recently been used in the study of protein structure and function. Peptides can be used as probes to see where protein-peptide interactions occur- see the page on Protein tags. Inhibitory peptides are also used in clinical research to examine the effects of peptides on the inhibition of cancer proteins and other diseases. However, additional investigations and experiments are required before the cancer-fighting attributes, exhibited by peptides, can be considered conclusive.

# HiMedia Scientist Won "Agar-Art Award" Organised by American Society of Microbiology (ASM)


Agar-Art the People's Choice Winner 2017

## Who said AGAR was only science?

*Agar is Art too*

HiMedia's scientist and artist Mrs Yogita P Phalke entered the Agar Art contest hosted by the American Society for Microbiology. Her artwork has been declared as Facebook People's Choice Winner 2017. The artwork is the portrait of Hon. Dr. G. M. Warke, Founder & CMD of HiMedia Laboratories Pvt. Ltd., Mumbai, India. It has been selected as winner among the 265 entries from 36 countries. **It has been created using HiCrome™ UTI Agar (Product Code : M1353)** Medium with *Enterococcus faecalis* ATCC 29212 on it. http://www.himedialabs.com/intl/en/products/Microbiology/Dehydrated-Culture-Media-HiCrome-Animal-based-Media-Bacterial/HiCrome™-UTI-Agar-M1353

For more info visit - https : //www.asm.org/index.php/ public-outreach/agar-art

The Winner,
Mrs Yogita P Phalke


Image that inspired the winner for the creative Agar-Artwork

# International Exhibition 2017

## Africa Health_Johannesburg

## IUMS_Singapore

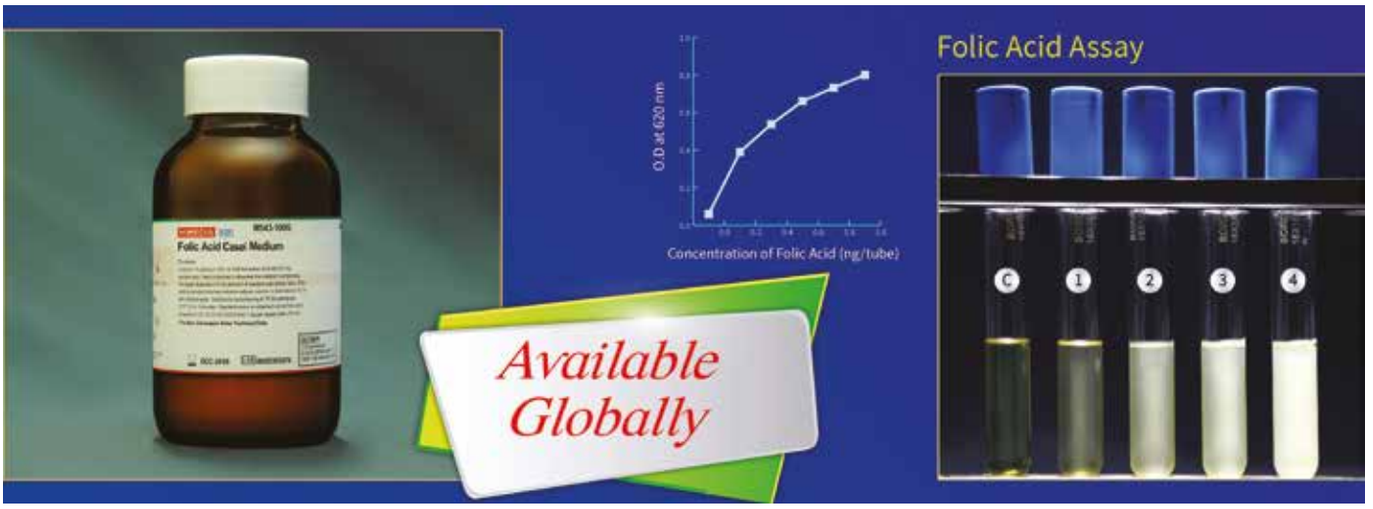
## Russia 2017


# National Exhibition 2017

## 7th Agri Asia_Gandhinagar Gujarat


# Folic Acid Casei Medium M543

Folic Acid Casei Medium is used for the microbiological assay of folic acid in blood serum using Lactobacillus casei ATCC 7469 as the test organism.




## Principle And Interpretation

Normal persons have a normal serum folic acid level of 9.9ng/ml. This level is greatly altered in case of abnormalities and also when the body is under a diseased state. Folic Acid Casei Medium is used for the microbiological assay of folic acid in blood serum using *Lactobacillus casei* ATCC 7469 as the test organism. This medium is based on the formulation of Flynn et al, modified by Baker et al and Waters and Mollin. The test organism used in vitamin assay generally requires three media, i.e. a culture maintenance medium, a inoculation medium and a test medium. The latter is usually a chemically defined medium that contains all the ingredients and nutrients essential for growth of the test organisms except the material under study. Similarly Folic Acid Casei Medium contains all the essential nutrients for the growth of *L. casei* except folic acid. Therefore additions of folic acid in specified increasing concentrations gives a similar increase in the growth response of *L. casei*. Technique.

# Exhibitions & Conferences

## Upcoming Events

**Feb 05**

05 Feb 2018 - 08 Feb 2018

**MEDLAB 2018, Dubai - UAE**

Venue: Dubai International Convention & Exhibition Centre, Dubai, UAE
Booth No. : Z4.G20, Hall - 4.

**Mar 18**

18 Mar 2018 - 21 Mar 2018

**ARABLAB 2018, Dubai - UAE**

Venue: Dubai International Convention & Exhibition Centre, Dubai, UAE
Booth No. : 546.

**Apr 04**

04 Apr 2018 - 06 Apr 2018

**LAB INDONESIA 2018**

Venue : Jakarta Convention Center, Jakarta, Indonesia
Stand No.: N 19

**Apr 10**

10 Apr 2018 - 13 Apr 2018

**ANALYTICA MUNICH 2018, GERMANY**

Venue: Messe München, Germany
Hall B1 Booth No. : 325

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Literature Code: N-TL550_00/HiMedia Newsletter/1217