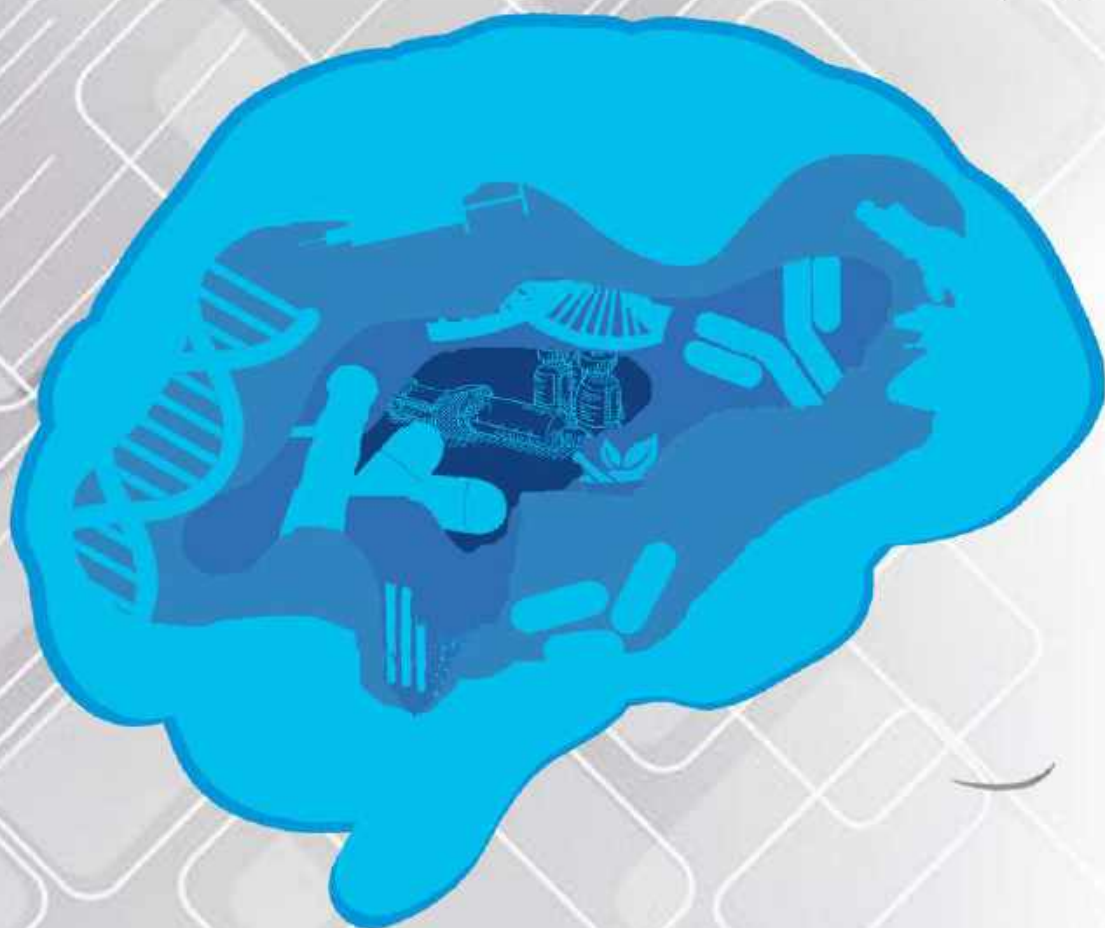




**12<sup>th</sup> Edition**



# Pharma Equinox 2020

---

## Biopharmaceutics

# PHARMACIST'S OATH

I swear by the code of ethics of Pharmacy Council of India, in relation to the community and shall act as an integral part of health care team.

I shall uphold the laws and standards governing my profession.

I shall strive to perfect and enlarge my knowledge to contribute to the advancement of pharmacy and public health.

I shall follow the system which I consider best for Pharmaceutical care and counselling of patients.


I shall endeavour to discover and manufacture drugs of quality to alleviate sufferings of humanity.

I shall hold in confidence the knowledge gained about patients in connection with my professional practice and never divulge unless compelled to do so by law.

I shall associate with organizations having their objectives for betterment of the profession of Pharmacy and make contributions to carry out the work of those organizations.

While I continue to keep this oath unviolated, may it be granted to me to enjoy life and the practice of pharmacy respected by all, at all times!

Should I trespass and violate this oath, may the reverse be my lot!



**“ You can only fit so many words  
into a postcard.**

**Only so many in a phone call.**

**Only so many into space  
before you forget that words  
are sometimes used for things  
other than filling emptiness.**

**”**

**-Sarah Kay**



## CONTENTS

WORDS FROM THE WISE	05
FROM THE PRINCIPAL'S DESK	06
FROM THE CHIEF COORDINATOR AND MAGAZINE INCHARGE	07
MESSAGE FROM THE MAGAZINE COMMITTEE	09
GALLERY	10
ANNUAL PROGRESS REPORT	20
SNAP STORY	36
LIVE BY FAITH; DEVELOP BY SCIENCE	38
SCIENTIFIC SECTION	39
A WORLD OF ENDLESS POSSIBILITIES	60
BREATHE. THE ART WITHIN YOU MUST LIVE!	62
SCALING THE GALAXY ONE STEP AT A TIME	64
VESCAP WHIZ KIDS	66
HEADS TALES	67
RX WINNERS	69
AVISHKAR	73
GIVING BACK TO THE COMMUNITY	74
LITERARY	76
YEARBOOK	86

## ADMINISTRATIVE BOARD

**Shri B.L. Boolani** - Founder Trustee & Trustee-In-Charge

<b>Shri B. L. Boolani</b> - President	<b>DR.(Shri) Prakash Lulla</b> - Member
<b>Shri Amar T. Asrani</b> -Secretary	<b>SMT.P.U.Vaswani</b> - Member
<b>Shri Suresh Malkani</b> -Treasurer	<b>Shri Vishu Lala</b> - Member
<b>Shri Bansi Wadhwa</b> - Member	<b>Shri R.A.Bhagia</b> - Member
<b>Shri Laxman Kanai</b> - Member	<b>Shri Rajesh Gehani</b> - Member



# WORDS FROM THE WISE



Dear students,

It is a matter of pride as our college launches the 12th edition of the Pharmaequinox.

The VES College of Pharmacy after 12 years of its glorious establishment steadily endeavors towards its goal of providing effective process of teaching and learning. I personally believe that real learning is possible through practical experience in the laboratory. I advocate use of novel and innovative techniques that encourages critical thinking and develops an aptitude of problem solving. Our endeavor is to provide training to students that empowers them to learn; apply the knowledge acquired; improvise, innovate and create. Our brilliant faculty is striving hard towards this goal so that we can help our students in realizing their dreams.

The academic year 2019-20 has been equally an eventful year with our institute achieving many laurels at state and national level. Our institution has worked hard towards creating

an ecosystem where academicians, students and industry can work in collaboration with one another. The induction of the Institution's Innovation Council (IIC) has marked the beginning of our journey to train young minds to innovate, create and nurture them to become entrepreneurs. With the completion of 12 years of this establishment, our faculty members can now invest more time and efforts in research and development. As per new National education policy 2019, Interdisciplinary research is the need of the hour with optimum blend of science and technology. I sincerely feel that our pharmacy, science and engineering institutes can come together and work together, complementing each other in the process to bring about reforms in the healthcare and information technology sector. VES looks forward to some innovative outcomes protected with Patent that can be made available to the industry for commercialization. I also urge faculty and students to invite problems from the industry to give them creative solutions.

Last but not the least; personally, through my experience, I can state that each one needs to take utmost care of their body and mind by maintaining a healthy lifestyle which comprises of regular exercise and nutritious food. Also cultivating a habit of reading regularly and keeping oneself abreast with the developments in the pharma world becomes a necessity to become successful in one's chosen career.

My message to all young minds would be to remain healthy and think creatively. Wish you all the very best for all your future endeavors.

**-Shri B. L. Boolani**  
President, VES  
Trustee-in-Charge  
VES College of Pharmacy



## FROM THE PRINCIPAL'S DESK



Dear students!

It is always a wonderful opportunity to interact with all of you on this occasion of releasing the next edition of our manuscript, Pharmaequinox.

In continuation with our legacy of being in the forefront as the best industry linked pharmacy degree college, Vivekanand Education Society's College of Pharmacy has secured a platinum ranking in the survey (2019) by AICTE-CII. VESCOP was one of the seven pharmacy colleges across the country and one of the three colleges in the university of Mumbai that was shortlisted for the final round of interaction with the jury in the selection process. The platinum ranking conferred to us has motivated us to work harder to fulfill the objective of building linkages with the industry. We are committed to work closely with the industry so that our students and faculty can keep on getting the opportunity to work on real life

problems given by the Industry.

Another feather in our cap was the four-star rating for the Institute's Innovation Council (IIC), the primary aim of which is to acquaint our students with the importance of innovation. We are amongst the top four pharmacy colleges in India to receive a four star rating. Our founder trustee and President of VES, Shri B. L. Boolani ji has been a front runner in promoting this idea and has played an important role in inspiring our students.

We wish to drive research and innovation in a big way in alignment with our mission of building research aptitude amongst our students and encouraging them to become entrepreneurs. With provision of live project in semester eight of the B pharm program and our additional initiatives such as Journal club activity, E-poster presentation and add-on courses on industry relevant topics, we are confident of achieving our mission with the right spirit.

As a team, the VESCOP staff is enthusiastic to take newer initiatives in the larger interest of our students and society. We hope that our Alumni association will be actively involved in bridging the gaps while achieving our goal of creating competent pharmacy professionals through VESCOP. Our Alumni association needs to take forward our initiative of research and innovation as mentors of our students. We also appeal to our alumni to give us some problems from Industry based on research and development, so that we can get the opportunity to work on a solution using our creativity and application ability. Our teachers, non-teaching staff and students are constantly working in harmony to make our vision a reality and raise VESCOP as a leading institution in education and research. I acknowledge the team efforts, proactive support and guidance by the VES Management and zealous participation by our students to reach this stage.

I hope that all our students work towards becoming successful professionals without forgetting their professional ethics and values. Wishing each one of you all the best in all your future endeavors.

Thank you.



## From the Chief Co-ordinator



Wishing all the members of VES COP a very happy and prosperous new year. It is my pleasure to be a part of this esteemed institution. I have seen this institution grow from something minis-

an invincible giant, all on its own. VES College of Pharmacy is an institution that is blessed with the mightiest teachers and cooperative students and together they have been working towards boosting the future of medicines in the country and helping it reach the pedestal, it rightfully belongs to. I feel very blessed to be associated with an organization like this. This past year was full of growth and prosperity and I wish many more years of success to this institution.

**-Prof. Jharna Das**  
Chief coordinator

## From the Magazine Incharge



Dear Reader,  
It makes me feel honored to present to you the 12th edition of our college Magazine "Pharma Equinox 2020". It's not just a magazine but it is the face of Vescop. Like a mirror, our magazine reflects a sum total of all activities carried throughout this

academic year. It's a beautiful amalgamation of diverse subjects with a perfect blend of information and innovation. Pharma Equinox provides a platform to the students as well as teachers to share their knowledge and to showcase their talents amongst everyone. The theme for this year's edition is 'Biopharmaceutics'. It involves the illustration of various topics such as CRISPR, Edible vaccines, Monoclonal antibodies, Drugs produced by fermentation technology and Regulatory aspects along with the information on the current trends related to the same. I congratulate our magazine committee who have really strived hard and worked upon this agenda effectively and have come up with this theme. The student editors have also done a commendable job and have handled their portfolio in a stipulated period of time. I sincerely appreciate and applaud all those who have contributed in bringing together this edition of Pharma Equinox. I hope readers will find this magazine very informative. I am grateful to all the stakeholders- Sponsors, Industries, Alumni, the encouragement shown by the Parents, the valuable support of our teaching and nonteaching staff and of course the enthusiastic participation from students. All the current achievements in both academic and extracurricular spheres are the fruits of their relentless and persistent efforts. I am thankful to our principal Dr. Supriya Shidhaye for giving us the liberty to take decisions in context to the matters related to the magazine and considering me as one of the deserving faculty members and the driver of the magazine cell. I am grateful to Mrs. Vidhi Bhatia as well who has given the entire charge of the magazine proceedings to me along with some tips for the same. I am sure this edition of Pharmaequinox will be deeply enjoyed and appreciated by each one of you.

**-Dr. Sandip Zine**  
Magazine Incharge





# AIRCARE

TECHNOLOGIES INDIA PVT. LTD.

## Wide Range of HVAC Equipments

For  
Residential, Hospitals, Institutional  
& Manufacturing Needs

Specialized in  
Energy Efficient Cooling & Ventilation System

We provide  
Consultancy, Planning & Design, Execution, AMC



: AUTH. SALES & SERVICE :

**DAIKIN**

**HITACHI**

**GENERAL**

**Panasonic**

**LG**

**SAMSUNG**



**MITSUBISHI  
ELECTRIC**

**VOLTAS**

**ONIDA**

**BLUE STAR**

Branches : \* SANPADA \* GOREGAON \* THANE \* PUNE \* MANGALORE

Contact : [www.aircareindia.com](http://www.aircareindia.com)

Mumbai - 9619883388 - [Sales@aircareindia.com](mailto:Sales@aircareindia.com)

Navi Mumbai - 9619883306 - [carecentrenb@aircareindia.com](mailto:carecentrenb@aircareindia.com)

Thane - 9833450500 - [salesthane@aircareindia.com](mailto:salesthane@aircareindia.com)

Mangalore - 9900287000 - [salesmlr@aircareindia.com](mailto:salesmlr@aircareindia.com)

# MESSAGE FROM THE MAGAZINE COMMITTEE

We, the Magazine Committee of 2019 – 20 are extremely proud and delighted to release the 12th edition of our annual magazine, Pharma Equinox. The theme for this year's magazine is Biopharmaceutics.

This edition is the synergised effort of its team; Magazine Secretary (Priyanka Ghosh), Assistant Magazine Secretaries (Shruti Kulkarni and Gauravi Parab) and editors (Scientific: Ashish Jhangiani, Haabil Hirkani, Shaina Rebello; English: Natasha Coutinho, Kavish Sanil, Nirja Chavan; Hindi: Manav Shah; Marathi: Sayali Kadam).

We express our gratitude towards our Principal, Dr. Supriya Shidhaye and to our previous Magazine in – charge, Mrs Vidhi Bhatia and current Magazine – In – charge Dr. Sandip Zine for their constant support and constructive feedback in making this edition more educative and phenomenal.

We have left no stone unturned in putting together the creative and scientific geniuses of our college and we sincerely hope that it is an interesting and inspirational read for everyone.







**F. Y. B. Pharm A**



**F. Y. B. Pharm B**





**S. Y. B. Pharm A**



**S. Y. B. Pharm B**





**T. Y. B. Pharm**



**L. Y. B. Pharm**





**M. Pharm (Pharmaceutics)**



**M. Pharm (Pharmaceutical Chemistry)**





**M. Pharm (Quality Assurance)**



**Teaching Faculty**





**Non Teaching Faculty**



**Non Teaching Faculty**





**Student Council**



**IPA**





**Rotaract**



**PHO**





**Institution Innovation Cell**



**Alumni Committee**



**Placement Cell**



*With best compliments from  
Umakant Satam*

**With best compliments  
from  
Karan Parab**




## SUNANDA

SPECIALITY COATINGS PVT. LTD.

ISO 9001 : 2015

45

YEARS



Voted among the Top 5 Waterproofing Brands in India  
The Experts' Choice Award 2018

LOOKING FOR PERMANENT SOLUTION  
FOR YOUR STRUCTURES?

GET DESIRED RESULTS ! BE RELIEVED !

SAVE COSTS ! SAVE THE STRUCTURES !


BUY PRODUCTS TODAY

RANGE OF PRODUCTS

• ANTI CORROSION COATINGS	• EPOXY COATINGS	• EPOXY ADHESIVES	• WATERPROOFING SYSTEMS
• HEAT INSULATING COATINGS	• ANTI-STATIC FLOORINGS	• MICRO CONCRETE	• CRACKLINE WATERPROOFING
• FIRE RESISTANT COATINGS	• POLYURETHANE FLOORINGS	• CONCRETE ADMIXTURES	• CRACK FILLERS
• VAPOUR BARRIER COATINGS	• FLOOR HARDENERS	• CORROSION RESISTING ADMIXTURES	• CONCRETE SEALERS
• POLYURETHANE COATINGS	• EPOXY GROUTS	• GALVANIC SACRIFICIAL ANODES	• CURING COMPOUNDS

Corporate Headquarters : 36<sup>th</sup> Floor, Sunshine Tower, Lower Parel, Mumbai - 400 013  
+91 22 6226 8000 | info@sunandaglobal.com | www.sunandaglobal.com

# Rane Mandap Decorators

Shell Colony Road,  
Near E. E. Highway Bridge,  
Sahakar Nagar, Chembur,  
Mumbai - 400 071  
**Cell: 98201 63850**

# ANNUAL PROGRESS REPORT





## ARRANGEMENT OF TERMS

### 1. ADMISSION STATUS

Centralized Admission Process (CAP) is followed for admission to F. Y. B. Pharm on the basis of MHT-CET score, H. S. C. score (for minimum eligibility), F. Y. M. Pharm. Students are admitted on the basis of GPAT scores as per the rules laid down by the State CET Cell, Govt. of Maharashtra. Separate CAP round was held for directly admitting D. Pharm students to S. Y. B. Pharm. The total numbers of students admitted in each class were as follows:

CLASS	STUDENT STRENGTH
F. Y. B. Pharm.	100
S. Y. B. Pharm.	96
T. Y. B. Pharm.	68
Final Y. B. Pharm.	64
F. Y. M. Pharm. (P+QA+PC)	36 (15+15+06)
S. Y. M. Pharm. (P+QA+PC)	29 (11+14+04)

### 2. FACULTY STRENGTH

1. No. of faculty members: 25
2. No. of faculty members with PhD: 9
3. No. of faculty members pursuing PhD: 12

### 3. VISITING FACULTY

For the following subjects, visiting faculties have been appointed during the A. Y. 2019-20

FIRST TERM AND SECOND TERM	
First Term	No. of Visiting Faculty (07)
	Mrs. Gayatri Aggarwal (Pharmacology III)
	Mrs. Ramalakshmi Anand (Pharmaceutical Jurisprudence)
	Mrs. Pallavi Kharkar (Intellectual Property Rights) (IPR)
	Mrs. Meena Shah (Regulatory Affairs)
	Mr. Sunil Budhkar (Regulatory Affairs)
	Mrs. Vedika Nihalani (Remedial Mathematics)
	Mr. Jawahar Nidamboor (Communication Skills)
Second Term	No. of Visiting Faculty (12)
	Mrs Meena Shah (Audits and Regulatory Compliance)
	Mr Sunil Budhkar (Pharmaceutical Validation)
	Mr Sunil Patil (Audits&Regulatory Compliance, Pharmaceutical Manufacturing Tech)
	Mrs. Ramalakshmi Anand (Human Anatomy and Physiology II)
	Mrs. Gayatri Aggarwal (Pharmacology I)
	Mrs Rajashree Date (Computer Applications in Pharmacy)
	Mrs Vedika Nihalani (Mathematics & Statistics)
	Mr Rajesh K (Mathematics & Statistics)
	Dr Elvis Martis (Computer Applications in Pharmacy)



	Mr Jawahar Nidamboor (Pharmaceutical Excipients)
	Mr Jaydeep Dhamnaskar (Pharmaceutical Management)
	Dr Anilkumar Gandhi (Advanced Biopharmaceutics & Pharmacokinetics)

#### 4. SCHOLARSHIPS

VESCOP students have received following scholarships in the academic year 2018-19

SR. NO.	SCHOLARSHIP GIVEN BY:	NO. OF STUDENTS		TOTAL AMOUNT RECEIVED
		UG	PG	
1	VES Trust	1		150000.00
2	Shreshtha Award	1		50000.00
3	Keswani Trust	1		10000.00
4	AICTE	-	24	12400/ month per student

VESCOP students have received following scholarships in the academic year 2019-2020

SR. NO.	SCHOLARSHIP GIVEN BY:	NO. OF STUDENTS		TOTAL AMOUNT RECEIVED
		UG	PG	
1	VES Trust	1		150000.00
2	Shreshtha Award	1		50000.00
3	Keswani Trust	1		10000.00
4	AICTE	-	24	12400/ month per student

#### 5. AFFILIATION AND APPROVALS:

Course	Name of the Body	Approval up to	Remarks
B. Pharm	Pharmacy College of India (PCI)	2021-22	Letter of Approval dated 10.06.2019
B. Pharm M. Pharm (Pharmaceuticals) M. Pharm (QA) M. Pharm (Pharm Chem)	All India Council of Technical Education (AICTE)	2019-20	F.No. Western /1-4262102914/2019/EO dated 10.04.2019

B. Pharm.	University of Mumbai	2019-20	No. Aff./ICD/2019-20/2004, dated 02.08.2019 (Permanent) No. aff./ICD/2019-20/789 dated 01.07.2019 (Continuation - Additional Intake)
M. Pharm. (P <sup>r</sup> ceutics) M. Pharm. (QA) M. Pharm. (Pharm. Chem.)		2018-19	No. Th./ICD/2019-20/2809 dated 23.09.2019
Ph.D. (Pharmaceutics)	University of Mumbai	2019-20	No. Th./ICD/2018-19/3283 dated 20.10.2018.
Ph.D. (Pharmaceutical Chemistry)	University of Mumbai	2018-19	No. Th./ICD/2019-20/2809 dated 23.09.2019

**6. ANNUAL LECTURE SERIES** - VES College of Pharmacy has taken up a new initiative and started "Annual Lecture Series in Pharmaceutical Technology" from 2017.

"Regulatory Challenges New Technology Adoption for Pharmaceutical Dosage Forms." and the Speaker was Dr Parizad A Elchidana Principal Technical Consultant-Pharma, ACG Worldwide, Mumbai-21. This activity was conducted on 27th Aug 2019.

## 7. CHEMTASTIC 2019

**Chemtastic-4 2019** was organized on 27th July 2019 under the convenorship of Prof. Rakesh Somani and organized by Department of Pharmaceutical Chemistry.

## 8. CAMPUS TO CORPORATE TRANSITION PROGRAMME

**C2C Transition program is conducted in the following avenues.**

- A. *VidyanManch* – Industry- Academia/Student interaction.
- B. *Disha* – Career Avenues after B. Pharm.
- C. *Talkathon*– Student Alumni interaction
- D. *Atmavikas* – Soft Skill Development

### Following sessions were conducted in A.Y 2019-2020

VIDNYAN MANCH			
Sr.No	Date and No of Participants	Resource person and designation	Topic
1.	10th August 2019 (41)	Dr. R.K. Maheshwari, Professor, SGSITS, Indore	Eco Friendly pharmaceutical applications of hydrotropic solubilization.
2.	4th October 2019 (40)	Mr. Kenji Obata, General Manager functional additives division, Asahi Kasei Corporation	Functional MCC and its application



Sr. No	Date	Resource person and designation	Topic
1.	13th August 2019 S.Y.B.Pharm-82	Dr Tarunkumar Dasgupta, Founder, Growwell	Career Avenues
2.	19th August 2019 T.Y.B.Pharm-70	Shubham Vanmali (Olympic Swimmer)	Persistence
Sr. No	Date	Resource person and designation	Topic
1.	20th August 2019 (84)	Preeti Vasudevan, Counsellor, VESLARC	Freedom through expression
2.	20th August 2019 (76)	Preeti Vasudevan and Meeta Brahmhatt, Counsellor, VESLARC	Effects of bullying, kinds of relationships and its conflicts, Self acceptance
3.	19th December 2019 (143)	Dr Saurabh Vispute Senior scientist, Global General Toxicology, Pfizer	Careers in Toxicology
4.	7th January 2020 (8)	Dr Abhijit Date Assistant Professor of Pharmaceutical sciences University of Hawaii	Research orientation
5.	9th January 2020 (68)	Ms. Anita Solanki Ms. Dorene Almeida Senior executive ACG capsules	New Products and Applications in Capsules
6.	13th January 2020 (385)	Mr. Rahul Tiwari	Interview and Grooming skills
7.	5 th December 2019.	Mr. Firdos Sofi (Research scholar NIPER)	Novel Synthetic strategies for new Compounds
8.	12 th December 2019.	Dr. Vijay Gadgil Vice President Aquapharm Innovation center Pune	Network pharmacology for New targets and new actives

## 9. PUBLICATIONS

VESCOP aims at communicating with the eminent researchers in the field of science and technology by publishing the review/research papers in the respective areas of specialization. The table elucidates the publication done by the faculties till date:

Sr. No.	Name of Faculty	Publication Details With Co-Authors, Article Name, Journal Name, Year, Volume, Issue Number, Page No. , ISSN Number, Impact Factor/H. Index Details
1	Harsha Kathpalia	Formulation of gastroretentive sustained release floating in situ gelling drug delivery system of solubility enhanced curcumin-soy lecithin complex; Journal of Drug Delivery Science and Technology, Volume 53, October 2019, 101205 ISSN 1773-2247 IF: 2.606 H Index: 38
2	Sonali Munj	Synthesis and antimicrobial evaluation of 3,4-dihydropyrimidin-2(1H)-one analogues, Indian Drugs, 56(5), May 2019, 59-63.

3	Dr. Anand S Chintakrindi	Design, Synthesis and Biological Evaluation of Substituted Flavones and Aurones as Potential Anti-Influenza Agents, Bioorganic and Medicinal Chemistry, 28(1), Jan 2020, 115191
4	Dr Mangal Nagarsenkar	Albumin nanocarriers for pulmonary drug delivery: An attractive approach" Monica Joshi , Mangal Nagarsenkar , Bala Prabhakar,* Journal of Drug Delivery Science and Technology, Volume 56, Part A, April 2020, doi.org/10.1016/j.jddst.2020.101529
5	Dr. Mushtaque Shaikh	A REVIEW ON DRUG DISCOVERY AND DEVELOPMENT FOR THE TREATMENT OF POLYCYSTIC OVARIAN SYNDROME, European Journal of Biomedical and Pharmaceutical Sciences, 2020 VOLUME 7, FEBRUARY ISSUE 2, pg No 131-142

## 10. PRESENTATIONS:

Sr. No	Name of the Presenting author	Title of the Presentation	Co- Authors/ Guide	Date	Details and Venue
1	Dr. Supriya Shidhaye	Challenges, Opportunities and Recent Advances in Cancer Therapeutics and its Molecular Targets	-	16th July, 2019	AICTE sponsored two weeks faculty development programme at Konkan Gyanpeeth Rahul Dharkar College of Pharmacy and Research Institute, Karjat
2	Harsha Kathpalia	Novel nano formulation of ACT for the treatment of multi drug resistant malaria	Dr. Supriya Shidhaye	30th March 2019	2nd prize, Tech showcase, VESCOP
3	Shivali Tank	Oral Pulsatile drug delivery system for Sildenafil Citrate to meet the unmet need for the treatment of Pulmonary Hypertension	Dr. Supriya Shidhaye	30th March 2019	1st prize, Tech showcase, VESCOP
4	Priyanka Ghosh and Siddhi Dukhande (TYB.Pharm)	Application of QbD in designing intranasal formulation	Mrs Chaitali Surve	Wednesday, 28th and Thursday, 29th August 2019	AICTE sponsored conference on QbD & PAT, An essential tool of Product Lifecycle Management BNCF, Vile Parle
5	Bhairavi Patankar	Positive effect of Melatonin on Dental Implants	Dr Anita Ayre	05/10/19	AICTE Sponsored Two Day National Conference on 'Challenges in the Development of Generics & Biosimilars' at Prin. K. M. Kundnani College of Pharmacy, Mumbai
6	Palak Karia	Biosimilars - An Innovative Approach in Pharmaceuticals	Dr Anita Ayre	05/10/19	AICTE Sponsored Two Day National Conference on 'Challenges in the Development of Generics & Biosimilars' at Prin. K. M. Kundnani College of Pharmacy, Mumbai
7	Sumit Gupta	Development of HPLC method for determination of Febuxostat in human plasma using HPLC -UV detector by experimental design approach	Vinayak Rashid, Anita Ayre	28th & 29th August 2019	AICTE sponsored conference on 'QbD & PAT, An essential tool of Product Lifecycle Management' at Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai



8	Yash Gada	Application of Quality by Design Principles in the formulation development of liquid SMEDDS of Vitamin E acetate	Anita Ayre	28th & 29th August 2019	AICTE sponsored conference on 'QbD & PAT, An essential tool of Product Lifecycle Management' at Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai
9	Sapana Patil	SeDeM Expert System - A journey from Direct Compression to Coprocessed excipients	Anita Ayre	28th & 29th August 2019	AICTE sponsored conference on 'QbD & PAT, An essential tool of Product Lifecycle Management' at Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai
10	Ms Meghna Kuradia Ms Arohi Paul	QbD based development and evaluation of topical microemulsion based hydrogel against fungal infections	Mrs Vidhi Bhatia	28th & 29th August 2019	AICTE sponsored conference on 'QbD & PAT, An essential tool of Product Lifecycle Management' at Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai
11	Rutika Shetye	Development and Optimization of Microemulsion based Drug Delivery System for Curcumin	Samruddhi Rane, Rajashree Hirlekar	28th & 29th August 2019	AICTE sponsored conference on 'QbD & PAT, An essential tool of Product Lifecycle Management' at Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai
12	Dr.Sandip Zine, Ms.Vaishnavi Dubey	Protein and Peptide Drug Delivery system" at AICTE sponsored two day national conference on "challenges in the development of generics and biosimilars		4th & 5th October 2019	K. M. Kundnanai College of Pharmacy.
13	Mr K V Shastri	Fabrication and Evaluation of Microsponge loaded Topical Formulation using Herbal Extracts	-	17 December 2019	Convocation Hall, University of Mumbai, Fort
14	Miss Neelam Pandey	Development and Evaluation of Microsponge based polyherbal Antiacne formulation	Mr K V Shastri	23 December 2019	Vivekanand Education Society's Polytechnic College, Chembur (East), Mumbai, Inter-University Avishkar Research Convention: 2019-2020
15	Miss Shivali Tank	Anti-Fungal Nail Lacquer: Apply and forget	Dr. Supriya Shidhaye	6th January 2020	1st prize, Final round University Level of 14th Avishkar Research Convention 2019-20.
16	Mrs. Pradnya Korlekar	Design, Development and Optimization of W/O/W Multiple Nanoemulsion of Gemcitabine Hydrochloride	Dr. Supriya Shidhaye, Miss Shivali Tank, Miss Bhagyashree Parab	6th January 2020	1st prize, Teacher Category Final round University Level of 14th Avishkar Research Convention 2019-20.

17	Ms. Sushmita Nichal, Mr. Hiren Mange	Essential Oils: Strengthening battle against antimicrobial resistance	Mrs. Ashwini Wani	4th January December 2020	K.C. College, Inter-University Avishkar Research Convention: 2019-2020,
18	Mr Shubham Ukey, Mr Husain Miyajiwal	Novel, safe and effective rectally administered formulations for constipation	Mr Ojaskumar D. Agrawal	23 December 2019	14th Inter-Collegiate Avishkar Research Convention: 2019-2020 at Dr. Bhanuben Nanavati College of Pharmacy, Vile Parle, Mumbai
19	Ms. Dhanshree Agre	Adhesive Topical Formulations	Mrs. Harsha Kathpalia	24 December 2019	14th Inter-Collegiate Avishkar Research Convention: 2019-2020 at VES Arts, science and commerce college, Chembur
20	Mr. Sumit Gupta	Dried Matrix Spotting - An effective & Safe approach for preclinical studies	Dr. Anita Ayre	5 January, 2020	3rd price, Category: Science & Technology, Final round University Level of 14th Avishkar Research Convention 2019-20.

## 11. SEMINAR/ CONFERENCES/WORKSHOP/EXHIBITIONS ATTENDED

Sr No	Name of Faculty	Topic	Venue and Date
1	Dr. Rajashree Hirlekar	One Day Workshop on "Data Organisation in Revised Accreditation Framework of NAAC"	Vidyalankar Institute of Technology, Wadala, 27/06/2019
		Understanding Regulatory Perspective of Excipients, Organised by Excipient Council of India, IPEC	SciTech Centre, Mumbai, 24/07/2019
		Syllabus Orientation Meeting, Pharmaceutics V [CBCS] of Final Year B Pharm Sem VIII	BNCP, Mumbai, 15/07/2019
		Syllabus orientation meeting for M. Pharm Sem I and II subjects	Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai 14/09/2019
2	Dr. Rajashree Hirlekar Mrs. Pradnya Korlkar	One day summit on Accreditation System for health Sciences (NAAC) Seminar	KGRDCP, Karjat 20/06/2019
3	Dr. Mushtaque Shaikh	Regional Mentoring Session for POC & Orientation Session in IIC2.0 and ARIIA2020 Trainer at Summer Training at VESCOP	Welingkar Education School. 25 July 2019
			Engaged a session on "Learnt from Experience : Use of Endnote for Bibliographic Management" on 22nd Jun 2019



4	Anita Ayre	TechMeet 2019 - An Academic -Industry Collaboration Organized by Perkin Elmer India	Bharati Vidyapeeth's College of Pharmacy, Navi Mumbai, 04/10/19
5	Sumit Gupta Guide: Anita Ayre Vinayak Kashid, Guide: Anita Ayre	Advanced QTRAP LC-MS-MS Technology Principles and Applications	National Facility for Research and Training The IPA-MSB's Bombay College of Pharmacy, Mumbai 25/09/19 & 26/09/19
6	Vinayak Kashid, Guide: Anita Ayre	HPTLC (Emphasis on USP-SOP and Applications)	Bombay College of Pharmacy, Mumbai 03/10/19 & 04/10/19
7	Harsha Kathpalia	The Pharma Gorilla, Latest innovations, trends and concerns, practical challenges and solutions in pharma	Hilton hotel, Andheri 27th march 2019
8	Harsha Kathpalia Mrs Chaitali Surve	AICTE sponsored conference on QbD& PAT, An essential tool of Product Lifecycle Management	Wednesday, 28th August and Thursday, 29th August 2019 at BNCP
9	Mrs Chaitali Surve	Digital disruption in academic leadership with digital launch of academisthan	Sir Pherozshah Mehta Bhavan Auditorium, Vidyanagari, UoM, Santacruz, 28th August, 2019
10	Dr.Sandip Zine	Orientation for Avishkar in the category 6 of Medicine and Pharmacy for all levels (UG, PG, PhD, Teacher pursuing PhD)	Bombay College of Pharmacy on 3rd August 2019 from 10 am to 4 pm.
11		Attended one day seminar on the topic "Innovations and challenges in analytical techniques in day to day pharma industry" organized by Phenomenex – India	Ramada Powai Hotel & Convention Centre, Powai, Mumbai. 19th September 2019
12	Mr Ojaskumar D. Agrawal	Attended Biopharma Conclave 2019	Hotel St. Regis, Mumbai, 26 and 27.9.19
13	Sonali Munj	Hands-on training/ Workshop on "Techniques in Molecular Biology" at Caius Research Laboratory,	4,5,6 September 2019 at St Xaviers College, Mumbai
14	Pradnya Korlekar and Brinal Pereira	Completed online GCP training National Institute of Health USA of Six hours It is an essential requirement to conduct a study in Human Participants	6th October 2019 (PSK) and August 2019 (BP) Online Caius Research Laboratory, St. Xavier's College, Mumbai,
15	Mrs. Pradnya Korlekar	Hands on workshop on Techniques in molecular biology	4th to 6th September 2019

16	Ms. Bhagyashri Parab Mrs. Chaitali Surve	Hands on workshop on Techniques in Molecular biology	Caius Research lab, St. Xavier's College, 4th to 6th September 2019
17	Mrs Prachitee Ayare	IPR/Patent related developments & Challenge in NDDS technology	Scitech Center, Jogeshwari, 06/07/2019
18		Two Days national conference on "Challenges in the development of generic and biosimilars" Presented poster entitled "Microfluidics technology for drug delivery: Area and Application"	04/10/2019, 05/10/2019 KMKCP
19	Prachitee Ayare Anita Ayre Karuna Nabar	Biopharma Conclave 2019	26/09/19 & 27/09/19 St. Regis, Mumbai
20	Dr. Anand S Chintakrindi	BioTecNika Schrodinger Joint Workshop on Computer-Aided Drug Discovery	Online Workshop, 22/7/2019 to 02/08/2019
21	Mr Pratik Barve	Hands-on training/ Workshop on "Techniques in Molecular Biology" at Caius Research Laboratory, St Xaviers College, Mumbai	Caius Research Laboratory, St Xaviers College, Mumbai 4th ,5th and 6th September 2019
22	Brinal Figer Pereira	Canvas of Clinical Pharmacology Workshop 2020	Seth GS Medical College and KEM Hospital, Mumbai 06 January 2020 to 10 January 2020

## 12.SEMINAR/CONFERENCES/WORKSHOP/EXHIBITIONS/ADDONCOURSE

### ORGANIZED/ CONDUCTED

Sr. No.	Name of Faculty/ Resource person and organizer	Topic	Venue and Date
1	Ojas A, Anand C, Anirudh B, Bhagyashree Parab, Kirti Bhawe	Digital Library Add On course	Last week July VESOP
2.	Department of Pharmaceutical Chemistry	Syllabus orientation Program in PCI syllabus for Chemistry related subjects in FY. B. Pharm and M. Pharm.	30th Aug. 2019 at VESOP
3.	Dr. Rajashree Hirlekar & Dr. Anita Ayre	Syllabus orientation Program in PCI syllabus for F.Y.M.Pharm, Branch: Quality Assurance	24/09/2019
4.	Dr. Rajashree Hirlekar & Dr. Mushtaque Shaikh	One day Seminar on Pharmacy Perspective of Revised NAAC	01.02.2020
5.	Mrs. Sonali Munj	Degree Distribution Ceremony	25th january 2020
6	Dr. Mushtaque Shaikh	e-waste collection seminar and Collection drive Tree plantation Drive	30.01.2020



### 13. YOGDAAN: Professional special contribution by Faculty Members

Sr. No.	Name of the Faculty	Capacity	Nature of Honour ( Details of contribution)
1	Dr. Supriya Shidhaye	Judge	Best Teacher at Oriental College of Pharmacy on Monday, 9th September, 2019.
		LIC Convener	Conducted LIC Inspection for B. Pharm. & M. Pharm. Courses in three colleges for A.Y. 2019-20 in May 2019.
		Chairperson	Board of Studies at the University of Mumbai
		Chairperson & Presentation Evaluator	PharmaNest: International Conference on Shaping the future of Pharma Industry Date: 9th Jan 2020
2	Dr Ganga Srinivasan	Chairperson	AICTE sponsored conference on QbD& PAT, An essential tool of Product Lifecycle Management held on 28th, 29th Aug 2019 at BNCP Mumbai
		Chairperson	M.Pharm (Pharmaceutics) PCI syllabus orientation ON 14TH Sept 2019 at BNCP.
		Coordinator	3rd Annual Lecture series in Pharmaceutical Technology with the theme " Regulatory Challenges New Technology Adoption for Pharmaceutical Dosage Forms."on 27th Aug 2019. Speaker Dr Parizad Elchidana
		Co-coordinator	AVISHKAR Reseach Convention (19-20) for Medicine and Pharmacy
3	Dr. Rajashree Hirlekar	LIC member	B. Pharm inspection at at Oriental College of Pharmacy, Mumbai M. Pharm and Ph. D. inspection at BN College of Pharmacy, Mumbai M. Pharm inspection at LHH College of Pharmacy, Mumbai
		Subject Expert: SEM VIII, CBCS, Pharmaceutics IV (Theory and lab)	SEM VIII, CBCS, Pharmaceutics IV (Theory and lab)
		Judge	Quantity sufficient event held under vortex at ICT on 12th October 2019
		Subject Expert- Sem I Modern Pharmaceutics	M. Pharm. Syllabus orientation meeting for M. Pharm Sem I and II subjects at Dr. Bhanuben Nanavati's College of Pharmacy, Vile Parle, Mumbai
4	Dr. Mushtaque Shaikh	Coordinator	Syllabus Orientation meeting of chemistry as per PCI, on 30th Aug 2019 at VESOP
5	Dr. Anand Chintakrindi Mrs Pradnya Korlekar Dr. Mushtaque Shaikh	AICTE-CII coordinator	Completed the formalities for compilation and submission of AICTE-CII survey form
6	Dr. Mushtaque Shaikh Dr. Anita Ayre (& Ms. Chaitali	ARIIA Coordinator	Completed the formalities for compilation and submission of ARIIA survey form
7	Dr. Anita Ayre	LIC member	B. Pharm inspection at OCP, Mumbai M. Pharm inspection at H.K.College of Pharmacy, Mumbai

8	Mrs Vidhi Bhatia	Organized lecture on Gender sensitization, Speaker - Mrs Kinjal Pandya, Stree Chetna	VES College of Pharmacy on 21st August 2019
11	Dr.Sandip Zine	Conducted Avishkar Orientation to UG students IPA - Students Forum Coordinator	29th August 2019: Third year and Final year students 31st August 2019: Second year students Industrial visit to "SHINETSU": Technical Application Lab, Thane, Total 26 students of SY B.Pharm participated
12	Mr Ojaskumar D. Agrawal	Delivered a talk on Examination Rules and regulations as per PCI Delivered a talk on Usage of Mendeley for Referencing Reviewer	Resource person during Student Induction Programme on 20.8.19 Invited speaker for FYMPharm Sem I students on 29.8.19 Journal of AOAC international
13	Mr Ojaskumar D. Agrawal Mrs Sonali Munj Dr Sandip Zine	SIP Incharge	Successfully conducted Student induction programme from 10.8.19 to 21.9.19
14	Dr.Sandip Zine & Mr. Ojaskumar Agrawal	Attended workshop on "Centralized Procedure for Student Council election at all Mumbai University affiliated Colleges"	Fort Campus, Mumbai University 10th July 2019
15	Mrs Chaitali S	Organizing committee for Ignition and Techshow	Planning and execution of Ignition and Techshow
16	Mrs Chaitali S Ms Bhagyashree Parab		Teachers' idea selected for Gyaan Vistaar 2019.
17	Mrs. Pradnya Korlekar	IAEC Member Secretary	Conducted IAEC meeting on 5th October 2019
18	Mrs. Brinal Pereira	IAEC Member	Conducted IAEC meeting on 5th October 2019
19	Dr. Anand S Chintakrindi	Resource person for Digital Library Course on 29.8.19 Principal Investigator	Demonstration of Endnote software for referencing as part of Digital Library course Fee Waiver of USD 500 for molecular dynamics software 'AMBER' from University of California, San Francisco
20	Mr Pratik Barve	Coordinator	Guided four VES students (Archit, Sachin, Asmita & Karen) who gave a presentation on "Cancer Therapeutics & Wellness" at IIT Hyderabad at the Wetlab Championships organised by MakeIntern
21	Mrs. Rashmi Wani	External Examiner Annual Member Article on Edible Vaccine	Final Year B.Pharm Sem-VII (Choice Based) For Second Half 2019 Pharmaceutical Analysis Lab III Society of Pharmaceutical Education and Research Selected for Annual Magazine Pharmaequinox to publish
22	Mrs. Pradnya Korlekar	NIRF coordinator	Completed the formalities for compilation and submission of NIRF 2020



## 14. Awards

Sr.No.	Name of the Faculty	Achievement
1	Chaitali Surve	Gyan Vistar award
2	Ms Bhagyashri Parab	Gyan Vistar award
3	Mrs. Pradnya Korlekar (Guide: Dr. (Mrs.) Supriya Shidhaye)	INTER-UNIVERSITY AVISHKAR RESEARCH CONVECTION:- 2019-20, Won first prize at State level, in category of teachers pursuing PhD
4	Ms Shivali Tank (Guide: Dr. (Mrs.) Supriya Shidhaye)	INTER-UNIVERSITY AVISHKAR RESEARCH CONVECTION:- 2019-20, Won first prize at State level, in category of PG.

## 15. PLACEMENT DETAILS: PG PLACEMENT

ACADEMIC YEAR		2018-19	
Sr. No	Employer	No. of Students recruited	Salary/Annum
1	VESCOP	1	2.4L
2	Rubicon	4	1.56L
3	P&G	2	3.3L
4	Vieco	1	2.1L
5	Sulphur Mills	1	3.25L
6	Meyer Organics	1	2.2L
7	Teva	1	2L
8	Aptar	1	2.2 L
9	Kotak Insurance	4	3.75
10	Cameo Health care	1	2L
11	GeBBS Healthcare Solutions	4	2L
12	TCS	2	2.2L
13	Zandra Life Sciences	1	2L
	<b>Total number of students placed</b>	<b>24</b>	

## UG PLACEMENT FOR BATCH PASSED OUT IN 18-19

S.NO	COMPANIES	No of Students placed
1	Nestle	02
2	Aditya Birla Capital	02
3	Pitchman Communications	03
4	Medlife	16
5	Sanofi Pasteur	02
6	Sun Pharma	01
7	Medusind	01
8	TCS	01
9	Aspira	03
10	GSK	01
11	Apollo Pharmacy	01
12	Mancesh Pharma	01

## PHO Activities 2019-2020

Sr. No	Event organized	Location for event	Date	Number of Participated population /Target audience
1	Blood Donation Camp	Dadar station	4/10/19	105 people donated blood
2	Blood Donation Camp	VES College of Pharmacy	9/10/19	104 people donated blood
3	Cleanliness Drive	Vision rescue centre, Mandala, Mankhurd	25/10/19	50
4	Community Outreach Camp	Sindhi society, Chembur east	24/10/19	40-50
5	Walk for freedom	Bandra	19/10/19	100+

## JOURNAL CLUB ACTIVITY

It is an initiative that has been undertaken at VESCOLP since last four years for students who are in their third year of Bachelors in Pharmacy Program as per the schedule.

## PARENT TEACHER MEETING

Parents Teachers Meeting [PTM] was conducted on 5.10.2019 [Saturday for S Y B Pharm, T Y B Pharm and Final Year B Pharm. Orientation program for First Year B. Pharm Parents and Students was held on 18th August, 2018 (Saturday) from 2:30 to 4:00 pm.

## Activities of Institution's Innovative Council (IIC2.0)

VES College of Pharmacy established the Institution's Innovation Council which is a recognized unit of MHRD's Innovation Cell. The council was flagged by MHRD's Innovation Cell on 12th Nov 2018. The objective of this council is to promote entrepreneurial skills in students.

The council followed the calendar of activities prescribed by the MHRD for 2018-19. This has brought an accolade for college in the form of **Four star rating by the evaluation committee of the MHRD**

## IIC activities activities in current academic calender

S.No	Activity	Date	Resource person	Faculty	Students
1	Motivational speech by entrepreneurs	13.07.2019	Mr. Dharmesh Mehta (Founder of PHARMAELITE)	03	90
2	Innovation day	15.10.2019	Various Competitions were organized	02	67
3.	Field visit to Tinkering Lab	25.01.2020	Organized field trip/visit to Tinkering Lab at Vivekanand English High School	02	25



4	Exhibition Cum Mentorship Session for Innovators	08.02.2020	IGNITION 2020	10	130
---	--	------------	---------------	----	-----

#### Industrial Visit :

1. For F.Y.M.Pharm QA students: Visit to Aptar Pharma, Rabale on 14th Oct. 2019.
2. For S.Y.M. Pharm and Third Year B. Pharm students: Visit ACTREC, Navi Mumbai on 28th November 2019
3. For Final Year B Pharm Sem VIII CBCS visit to P and G MAP LAB, Chembur (East), Mumbai, visit on 3 January 2020 (Friday)

**NIRF-2020 Ranking :** Submitted data on DCS portal of NIRF, result awaited

**AICTE CII Ranking:** VESOP has received platinum ranking in 2019.

#### DEPARTMENT OF LIFELONG LEARNING (DLLE)

Every year VESOP guides the number of student activities by registering with the Department of Life Long & Extension, (DLLE) University of Mumbai. Many of the students have won accolades in the DLLE festival entitled "UDDAN" in the past.

Sr No.	Project	Batch (No. of Students)	Students Activities
1.	PEC (Population Education Control)	SY B Pharm: No of participants Div A, B) : 33	Activities : Essay writing, Powerpoint Presentation, Talk by guest Lecturer, Skit/play, Poster making.
2.	CP (CareerProject)	TYB Pharm No of participants : 37	Activities : Selection of a career and Preparation of posters, brochure and Conducting 2 interviews of people.
3.	PEC (Population Education Control)	LY B Pharm No of participants : 24	Activities : Essay writing, PowerPoint Presentation, Talk by guest Lecturer, Skit/play, Poster making.
<b>DLLE Community Level Activity Academic Year 2019-20</b> Vivekanand Education Society's College of Pharmacy, Chembur conducted a career guidance seminar and performed skits based on social awareness.  <b>The activity was coordinated by Mr K V Shastri &amp; Mr Pratik Barve (DLLE Extension Teachers) and Sita Patel &amp; Prajakta Deole (DLLE Student Managers)</b>			

#### VESOP STUDENT COUNCIL ACTIVITIES

Sr No	Event Name	Activities
1	Freshers' party	The Freshers' Party 2019 was organised by the Student Council on 30th August, 2019. Mr. Fresher 2019-20 was Siddhesh Hatle, Miss Fresher 2019-20 was Upasana Tiwari.
2	Bone Marrow donor registry india ( mdri) stem cell donation	A Stem Cell Donation Camp was held in VES College of Pharmacy on 11th September, 2019.

3	<b>Teacher's Day Celebration</b>	The Student Council along with the Rotaract Club of VES College of Pharmacy organized a small event for the teachers on 11th September, on the occasion of TEACHER'S DAY.
4	<b>Jagruti event</b>	Jagruti is a group Patriotic Song Singing Competition organized by Vivekini. It was conducted on the 15th of August 2019 on the occasion of Independence
5	<b>Vigilance Awareness Programme</b>	The Student Council in association with Union Bank of India organized the Anti-Corruption Campaign to mark the Vigilance Awareness Week 2019 on <b>Date: 10th October, 2019</b>
6	<b>Garba Event</b>	Event: Garba-Raas 2019 Date: 5th October 2019
7	<b>Plastic Waste Free Campaign</b>	As a part of Swatch Bharat Campaign, the Student Council '19-20 organized a "Plastic Waste Free Campaign", , in our VES Campus II on 24th October, 2019

## Research Grants Received

SrNo	Faculty	Title	Funding Amount INR	Period	Role as PI / Co-PI	Agency	Status
1.	Dr Anita Ayre	Development and validation of analytical method for Vitamin D3 followed by stability indicating assay and diffusion studies of the developed topical formulation	1,50,000/-	July 2019 till December 2019	PI	Cerelia Nutritech	In process
2.	Mrs Chaitali Surve and Dr Supriya Shidhaye	Development, scale up and Tech Transfer of separator gel	1,20,000/-	Nov 2019	PI	Adex Pharmaceuticals	In process
3.	Dr Supriya Shidhaye Dr Rajashree Hirlekar Mrs. Harsha Kathpalia Ms. Bhagyashri Parab Ms. Shivali Tank	Design and development of novel formulations	50,000/-	Nov 2019	PI	IMCD	Completed
4.	Mrs. Pradnya Korlekar, Miss. Brinal Pereira, Mr. Avinash Suryawanshi	Evaluation of novel formulations for anti inflammatory activity and Pharmacokinetics	4,50,000/-	January 2020 to June 2020	PI	Cerelia Nutritech	In Process





**Lokesh Thawani**  
T.Y.B. Pharm

# Snap Story



**Lokesh Thawani**  
T.Y.B. Pharm



**Mrunmay Joshi**  
F.Y.B.Pharm



**Lokesh Thawani**  
T.Y.B. Pharm



**Lokesh Thawani**  
T.Y.B. Pharm



**Jayesh Lakhpatiani**  
S.Y.B.Pharm



**Gerard Fernandes**  
F.Y.B.Pharm



**Gauravi Parab**  
S.Y.B. Pharm

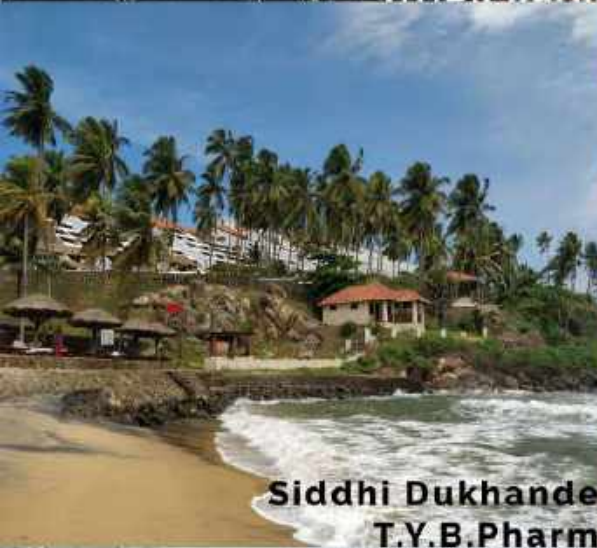




**Priyanka Ghosh**  
T.Y.B.Pharm



**Parth Mehta**  
T.Y.B.Pharm



**Siddhi Dukhande**  
T.Y.B.Pharm



**Sayali Kadam**  
T.Y.B.Pharm



**Mrunmay Joshi**  
F.Y.B.Pharm



**Sayali Kadam**  
T.Y.B.Pharm



**Shruti Kulkarni**  
S.Y.B.Pharm



# *"Live by faith ; Develop by Science."*



An interview of Dr. Naveen K Jain was conducted by Ms. Priyanka Ghosh, Ms. Gauravi Parab and Ms. Shruti Kulkarni.

Dr. Naveen K Jain is a molecular pharmacologist having around 21 years of research experience in Drug discovery, Pre-clinical development and NDDS. He is a post doctorate in Molecular Oncology from UCLA and also has a vast experience in developing and conceptualising new ideas and their clinical realisations for various unmet therapeutic needs.

## **1. Could you elaborate on your career path?**

I completed my BPharm from the University of Rajasthan. I am a gold medallist and also a G.P. Nair and M.L. Khosana award winner. I pursued my higher education at the University of pharmaceutical science and research in Punjab, Chandigarh under the eminent guidance of Prof. S.K. Kulkarni. My area of research was mainly pain and inflammation, involvement of COX2 in pain related pathways and I also worked on exploring new mechanistic pathways on new combinations including synergic mechanisms. In 1998 I was hired by Panacea Biotec in R and D sector as a research scientist. In this new role, I started working on drug delivery projects and mechanistic aspects of phytopharmaceuticals. Later on, I joined the PhD programme at

Punjab university to pain pathways, and role of COX2 and COX1, its impact on neuropharmacology. I have also worked on increasing the GI tolerability of existing NSAID by making metal conjugated and nitro NSAIDs. My undying interest in the field of research led me to join the post doctorate programme in molecular pharmacology at the University of California, Los Angeles. The research programme was aimed to monitor the Cox-2 gene expression in inflammatory animal models by non-invasive imaging techniques in living system. We also applied this research technique in monitoring gene expression in skin cancer models. This research work was published in highly reputed journals of imaging biology. I have a total of 43 publications into my credit.

## **2. What is the basic job profile of a molecular pharmacologist?**

The job profile of a molecular pharmacologist is an integration between cell biology and pharmacology, and basically warrants one to understand the cellular targets for therapeutics. We need to understand how chemical substances interact at the molecular level. A molecular pharmacologist works as a part of a research team which is responsible for screening compounds, developing drugs, screening targets and undertaking controlled experiments to develop a clinical candidate with a strong proof of concept.

## **3. What are the prerequisites for choosing to pursue a career in molecular pharmacology?**

A BPharm degree is sufficient. But slight modifications should be done in the MPharm programme. A 6-month course of cell biology which includes cellular biological techniques, how to maintain and grow the cell line, western blotting, northern blotting and RT PCR techniques should be included in the first year of MPharm and specialization can be achieved in the second year of MPharm.

## **4. In what other paths can one branch out after getting a degree in molecular pharmacology?**

After pursuing a degree in molecular pharmacology one can go for higher research studies in the same or can opt for PhD programmes in molecular research. One can also branch out in molecular pharmaceuticals for formulations and drug delivery mechanisms as developing targeted therapies.

*All the views expressed above are solely Dr. Naveen K Jain's personal views.*

SCIENTIFIC  
SECTION  
BIOPHARMACEUTICS





## GENE DRIVE

Dr. Ganga Srinivasan<sup>1</sup>, Mrs. Laxmi Yadav<sup>2</sup>

<sup>1</sup>HoD Dept. of Pharmaceutics, V.E.S. College of Pharmacy, Chembur, Mumbai-400074

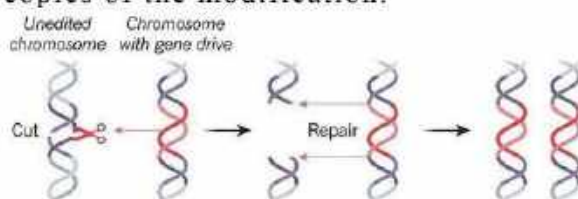
<sup>2</sup>S.Y. M. Pharm, Dept. of Quality Assurance, V.E.S. College of Pharmacy, Chembur, Mumbai-400074

### WHAT IS GENE DRIVE?

The new genetic engineering technology called Gene Drive is a genetic occurrence that arises in the world and spreads rapidly through a species by a fixed trait via sexual reproduction over various years. Gene drive organisms are not aimed to remain where they are delivered, but instead designed and purposely built to increase and to drive their altered genes into wild populations. Generally, genes have a 50-50% chance of being inherited, but gene drive system could enhance that chance to 80-100%. This ensures that over the progression of various generations as a fixed trait could become more and more common within a particular species.

### HOW A GENE DRIVE WORKS?

Gene drive utilizes CRISPR to introduce and spread a genetic alteration through a population at higher than normal rates of inheritance. Once a gene drive is engineered into genome, the offspring will inherit the drive on one chromosome and a normal gene from its other parent. During early development, the CRISPR portion of the drive cuts the other copy. The cut is then repaired using the drive as a template, leaving the offspring with two copies of the modification.



### Essential features and possible use of gene drives:

- Defining features:
  1. Persistency and transmission
  2. Possible to begin permanent ecological change
- Two possible uses:
  1. Population suppression: Decline in numbers
  2. Population replacement: alter genetic attributes.

### LATEST RESEARCH AND INNOVATIONS IN GENETICS:

1. New medical technologies and innovations have significantly increased that how scientists are allowed to work with genetics. Gene therapy treatments, analysis of fully patterned genomes, and simplified genetic tests are just a few examples of how researches are leveraging new capabilities to improve genetic health care.
2. The CRISPR family arises from a bacterium, where it functions as an immune response to viral threats. Palindromic sequences are found to be interspaced between regions of viral DNA from previous bacteriophage infections. CRISPR related technique (Cas) genes are moreover situated close by, coding for endonucleases and helicases.

3. CRISPR-Cas9 is novel a technology that allows genetics and medical researchers to modify parts of the genome by deleting, attaching or altering sections of the DNA tsequences.
4. It is faster, economic, and more accurate than earlier techniques of editing DNA and has a broad range of possible applications.

### **Future prospects for CRISPR-CAS13:**

One of the important future challenges for the utilization of CRISPR-cas13 approach as a treatment option is appropriate method of delivery into human tissues. Additionally, important ethical issues included in editing the DNA, involve worries over genome editing and genetic enhancement in embryos. However, this approach could allow a novel and revolutionary approach for both treating and curing genetic diseases.

### **1. Manipulating RNA sequences using CRISPR-Cas13:**

CRISPR-Cas13 is an RNA modifying approach that can make changes to protein sequences without reshaping the genome in a nucleus. The latest approach in CRISPR-Cas13 technology measures that it can now be used to discover and even decrease cancer related gene expressions.

### **2. CRISPR-based 'allelic drive' allows genetic editing with selective precision and broad implications:**

Scientists have now developed a new version of a gene drive that opens the door to the spread of specific, favorable subtle genetic variants, also known as "alleles," throughout a population. The new "allelic drive," described is equipped with a guide RNA (gRNA) that directs the CRISPR system to cut undesired variants of a gene and replaces it with a preferred version of the gene. The new drive extends scientists' ability to modify populations of organisms with precision editing. Using word processing as an analogy, CRISPR-based gene drives allow scientists to edit sentences of genetic information, while the new allelic drive offers letter-by-letter editing. The researchers describe two versions of the allelic drive, including "copy-cutting," in which researchers use the CRISPR system to selectively cut the undesired version of a gene, and a more broadly applicable version referred to as "copy- protected from gRNA cleavage.

## **APPLICATIONS OF CRISPR/CAS GENE DRIVES:**

### **1. Using Gene Drives to Target Mosquitoes and Eradicate Malaria:**

One of the most general uses of gene drives is focused on eliminating vector-borne diseases (infectious diseases transmitted by insects or other arthropods). There has been plenty of interest in establishing a drive that could eliminate malaria, a disease caused by a Plasmodium parasite and spread by Anopheles mosquitoes. Various CRISPR-based gene drives have been developed and tested in holding mosquito populations.

### **2. Controlling Invasive Species & Pests with Gene Drives:**

Unlike, eradicating undesired diseases, CRISPR could be utilized in a gene drive to manage or get rid of invasive species. Species that are established to areas where they do not occur naturally can do a substantial amount of ecological and economical damage. They may compete with or prey on native species, sometimes driving them to extinction. Suppression or modification of gene drives can be used to eradicate species in areas where they are not native. One study used computer models to assess CRISPR-based gene drives that could potentially eradicate invasive vertebrates (mice, rats,



and, rabbits) from islands by causing death or sterility in homozygous females, or by changing females into sterile males.

### 3. Adapting Gene Drives to Protect Endangered Species

While gene drives are most commonly used to control or decrease the population of target organisms, they may also be used to help save species that are in danger of becoming extinct. Through modification of gene drives, a protective gene could be spread. For instance, frogs and other amphibians are in dramatic decline worldwide in large part due to chytrid fungus. The fungus causes a skin disease that is often lethal. A gene preventing fungal infections could potentially save many frogs and other amphibian species from extinction.

#### Recent breakthroughs in CRISPR gene drives:

There has been a reasonable extent of progress in developing CRISPR-based gene drives in the past couple of years. Various activities have directed on developing gene drives in mosquitoes and other insect vectors to conflict diseases. In the summer of 2018, a team of researchers successfully tested a gene drive in mammals for the first time. The researchers advanced a gene drive that disturbed a coat color gene in a group of laboratory mice. They state that their findings may one day lead to gene drives designed to eradicate invasive mice, and can possibly also be used to produce complex mammalian phenotypes in the lab.

#### Future aspects of gene drive:

Gene drive research is progressing rapidly, and the designed applications will likely continue to enlarge as genome editing tools such as CRISPR and become more elegant. New scientific information and public perspectives increase almost on a monthly basis pertaining to the use and application of gene drive research.

#### Conclusion:

The fastest growing nature of this field is both encouraging and a point of interest. Gene-drive modified organisms hold assurance for addressing constant or crucial-to-solve challenges, such as the eradication of vector-borne diseases and the conservancy of vulnerable and endangered species. But the considered efficiency of gene-drive modified organisms may lead to signal for their discharge in perceived trouble situations before there is enough knowledge of ecological effects, and before reduction plans for unexpected harmful consequences are in place. Continuous interpretation and assessment of the social, natural, juridical, and noble considerations of gene drives will be desired to build this technology responsibly and accommodate research and administration to the field's complex and arriving challenges.

#### References:

1. Rode, N., Estoup, A., Bourguet, D., Courtier-Orgogozo, V. and Débarre, F.; Population management using gene drive: molecular design, models of spread dynamics and assessment of ecological risks; Conservation Genetics 20; 2019; 671-690.
2. 'Next-generation gene drive arrives'; Mario Aguilera; Eurekalert; 2019



## CRISPR: A Science beyond Magic.

Sejal Mhatre<sup>1</sup>

<sup>1</sup>F.Y.B. Pharm, V.E.S.CO.P., Chembur (E), Mumbai- 400074

### **ABSTRACT:**

Prokaryotic CRISPR-Cas is the locus that encodes proteins that function as an adaptive immune system against viruses that are infectious and also against plasmids. Immunity is mediated by Cas nucleases and small RNA guides. These specify a cleavage site within the genome invader. In type II CRISPR-Cas systems, DNA is cleaved by the RNA-guided Cas9 nuclease. From bacteria to humans, Cas-9 can be reprogrammed to create ds-DNA breaks in the genomes of a variety of organisms. Furthermore, a nuclease- null Cas9 has been developed to regulate endogenous gene expression and to label genomic loci in living cells. Targeted genome editing and gene regulation mediated by Cas9 are easy to program, scale, and multiplex, allowing researchers to decipher the causal link between genetic and phenotypic variation.

### **INTRODUCTION:**

CRISPR technology is a simple but still a powerful tool for editing genomes that allows researchers to easily alter DNA sequences and the modification of gene function. Applications of CRISPR include correcting genetic defects, treating and preventing the spread of diseases and improving crops. However, CRISPR also raises ethical concerns. CRISPRs are specialized stretches of DNA. The enzyme Cas-9 acts as a pair of molecular scissors, capable of cutting strands of DNA.

### **METHODOLOGY:**

CRISPR is a technology that was adapted from the natural defense mechanisms of bacteria and archaea. Including Cas9, these organisms use CRISPR-derived RNA and various Cas proteins to foil attacks by viruses and other foreign bodies. This is done by primarily chopping up and destroying the genetic material of the foreign invader. When these components are transferred into other, more complex, organisms it allows for the manipulation of proteins often referred as "editing". The genomes of different organisms encode a series of messages and instructions within their DNA sequences. Genome editing involves changing those sequences, hence changing the messages. This can be done by inserting a cut break in the DNA and tricking the cell's natural DNA mechanisms into introducing the changes we want.

Operationally, you design a stretch of 20 [nucleotide] base pairs that match a gene that you want to edit. An RNA molecule complementary to those 20 base pairs is constructed. Then the RNA plus the protein [Cas9] will cut the DNA at that site, like a pair of scissors, and ideally nowhere else. Once the DNA is cut, the cell's natural repair mechanisms kick in and work to introduce mutations or other changes to the genome. There are two ways this can happen: one repair method involves gluing the two cuts back together. This method referred as "non-homologous end joining," tends to introduce errors. Nucleotides are accidentally inserted or deleted, resulting in mutations, which could disrupt a gene. In the second method, the break is fixed by filling in the gap with a sequence of nucleotides. In order to do so, the cell uses a short strand of DNA as a template. Scientists can supply the DNA template of their choosing, hence writing-in any gene they want, or correcting a mutation.

### **RECENT ADVANCEMENTS AND ACHIEVEMENTS:**

#### **1) CANCER:**

In October 2016, the journal nature reported a lung cancer patient in China became the first of 10 people in the world to receive an injection of cells that had been modified using CRISPR. Led by oncologist Dr. Lu You at Sichuan University in Chengdu, the researchers, modified the immune cells taken from the patient's own blood and disabled a gene that produces a protein that cancer cells normally hijack in order to divide and multiply. The hypothesis is that without the protein, the cancer cells would fail to multiply



## 2) HIV:

CRISPR has HIV lined up in its sight. Researchers, in May 2016, used CRISPR to snip the virus from the cell it was infecting, shutting down the virus's ability to replicate. The use of this technique, which was tested in three different animal models, was the first time that researchers had demonstrated a way to eliminate HIV from infected cells.

## 3) HUNTINGTON'S DISEASE:

About 30,000 people in the United States have an inherited condition called Huntington's disease. It is a fatal genetic disorder that causes nerves in the brain to deteriorate over time, according to the Huntington's Disease Society of America. In June 2017, scientists at the Institute of Genetics and Developmental Biology at the Chinese Academy of Sciences, used CRISPR to snip out part of the mutant huntingtin gene that produces the toxic bits after which, the number of toxic fragments decreased in the mice's brains, and the neurons began to heal. The affected mice regained some of their motor control, balance and grip strength. Although their performance on certain tasks was not as good as that of healthy mice, the results showed the potential of CRISPR to help fight this condition.

## 4) EDITING HUMAN VIABLE EMBRYO:

In February 2017, scientists at The National Academies of Sciences, Engineering and Medicine issued an assessment of human gene editing was acceptable but only under certain conditions. The Science News reported that the group also said that altering the cells in embryos, eggs and sperm was ethically permissible provided that it was done to correct a disease or a disability, not to enhance a person's physical appearance or abilities.

Researchers at Guangzhou Medical University in China reported that scientists used CRISPR-Cas9 to introduce and then edit out disease-causing mutations from human embryos. The study was done to show that the genetic editing could be done at the embryonic stage. The embryos were not implanted in a human.

## Limitations:

A new study published in Nature Biotechnology suggested that this day may be further off than expected — and that Cas9 enzymatic swordsmanship may result in much more collateral damage than previously thought.

The study authors found that while using CRISPR-Cas9 to edit the DNA in both mouse- and human-derived cells, huge chunks of DNA were unintentionally being deleted, rearranged and otherwise mutated so severely that cells lost function in about 15 percent of cases.

Scientists at the Wellcome Sanger Institute in England said that the study provides the most systematic and severe reckoning of the potential genetic damage caused by CRISPR manipulation to date and the results may be reason to rethink the technology's use in clinical settings until further research can be done.

## Conclusion:

CRISPR-Cas9 based technologies provide an accessible and flexible means to alter, regulate, and visualize genomes, enabling biological research and biotechnological applications in a wide range of fields. From understanding the genetics of previously unstudied organisms to discovering genes that contribute directly to disease, CRISPR-Cas tools have vastly accelerated the pace of research. With multiple Cas9-based clinical trials in progress or beginning soon, the field of Cas-based Biotechnology is developing at a rapid pace, the results of which will likely guide future use for somatic cell editing both ex-vivo and in patients, leading to recent rulings by the U.S. Department of Agriculture, outside of the clinic, agricultural applications of CRISPR-Cas9 are already creating products for various markets about their regulation. This ever-expanding range of applications firmly positions the CRISPR-Cas toolkit at the cutting edge of genome editing and, more broadly, genetic engineering.

## References:

1. 'Luciano Marraffini, Ph.D. investigates how bacteria acquire immunity to viruses via CRISPR-Cas systems', Rockefeller.
2. 'What Is CRISPR?', Aparna Vidyasagar, livescience, 2018.
3. '10 Amazing Things Scientists Just Did with CRISPR', Tracy Staedter, livescience, 2017
4. 'CRISPR Gene Editing May Be Doing More Damage Than Scientists Thought', Brandon Spektor, livescience, 2018.
5. Gavin J. Knott, Jennifer A. Doudna; CRISPR-Cas guides the future of genetic engineering; Science 6405; 2018; 866-869.

## BIOSIMILARS - A BRIEF OVERVIEW

Mr. Keyur V Shastri<sup>1</sup>, Aswathi Peter<sup>2</sup>, Shivani Shelke<sup>2</sup>, Sonali Padekar<sup>2</sup>

<sup>1</sup>Assistant Professor, V.E.S.C.O.P., Chembur (E), Mumbai 400074

<sup>2</sup>F.Y.M.Pharm [Quality Assurance], V.E.S.C.O.P., Chembur (E), Mumbai 400074

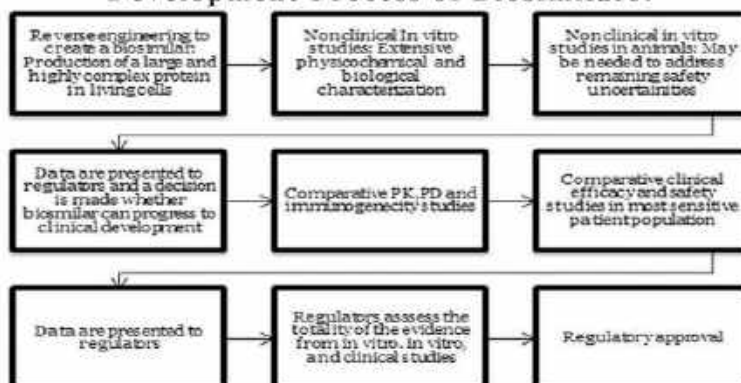
**Abstract:** Biosimilar is a pharmaceutical drug that is almost an identical copy of a biologic manufactured by a different company. Biosimilars are officially approved versions of original "innovator" products and can be manufactured when the original product's patent expires. It's important to understand that biosimilars are exactly similar to the original biologic. Biologics are complex living cells and they cannot be exactly replicated like generic drugs.

**Introduction:** The foundation of biologic medicines lies in recombinant DNA technology. They involve genetic engineering of a cell that is an intricate, sensitive process and are often specific to a particular medicine. Biologics have very sensitive factors such as temperature and pH which makes them difficult to characterize and hard to produce on large scale. Any minor modifications may cause alteration in characteristics and also change in structure, stability and other qualities of the final product. Some of the most important medicines are biologics which include albumin, monoclonal antibodies, human insulin used for burns or liver failure, cancer and diabetes.

A Biosimilar is required to show similarity with reference biologic on the basis of:

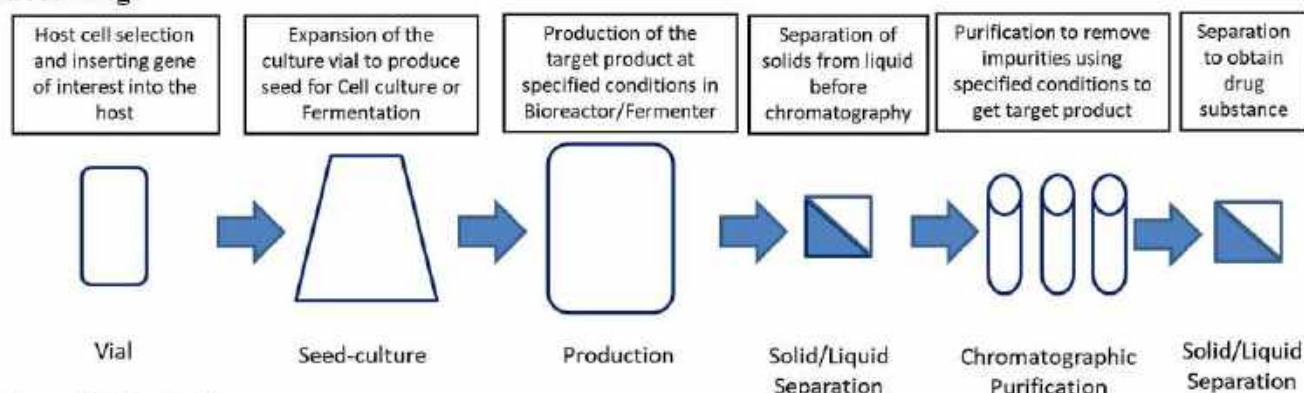
- 1) Analytical (testing in a lab for structural/physical similarity),
- 2) Non-clinical (testing for function/activity/toxicity) and
- 3) Clinical data (testing in humans for safety and efficacy) in terms of structural characteristics, safety and efficacy.

### Development Process of Biosimilars:





## Manufacturing:



## Examples of Biosimilars:

Biologic Drug	Biosimilar (Provider)	Indication
Neupogen (filgrastim)	Zarxio (Sandoz)	For the treatment of neutropenia
Enbrel (etanercept)	Erelzi (Sandoz)	Reduces the sign and symptoms of Rheumatoid arthritis
Herceptin (trastuzumab)	Ogivri (Mylan/Biocon)	Indicated for treatment of breast cancer gastric cancer
Remicade (infliximab)	Inflectra (Pfizer), Renflexis (Bioepis)	For the treatment of Psoriatic arthritis, Crohn's disease, Ulcerative colitis
Humira (adalimumab)	Amjetiva (Amgen)	For the treatment of spondylitis, Crohn's disease, arthritis, psoriasis

## Conclusion:

Biosimilars hold promise to improve patient's accessibility for many malignant and nonmalignant ailments by reducing the treatment cost. Since the use of the first biosimilar, the development and uses of "biosimilars or similar biologics" have witnessed substantial growth. India is the leading producer of biosimilar which should frame effective guidelines, nomenclature regulations and proper pharmacovigilance program.

## References:

1. Nandagopal, A., Shakeel, Y., & Tirunagari, M. (2018). Biosimilars: Current scenario and challenges in India; ACTA Pharmaceutica Scientia 56(1); 2018.
2. Agbogbo, F. K., Ecker, D. M., Farrand, A., Han, K., Khoury, A., Martin, A., McCool, J., Rasche, U., Rau, T. D., Schmidt, D. et al; Current Perspectives on Biosimilars; J. Ind. Microbiol. Biotechnol 46 (9-10); 2019; 1297-1311.
3. Rugo, Hope & Linton, Kim & Cervi, Paul & Rosenberg, Julie & Jacobs, Ira.; A clinician's guide to biosimilars in oncology; Cancer Treatment Reviews 46; 2016; 73-79.
4. 'Amgen Inc. v. Hospira, Inc. (Fed. Cir, 2017)'; Andrew Williams: Patentdocs; 2017.

## EDIBLE VACCINES FOR PREVENTING ROTAVIRUS INFECTIONS

Sayli A. Sawant<sup>1</sup>, Dr. Sandip Zine<sup>2</sup>, Mr. Ojaskumar Agarwal<sup>2</sup>

<sup>1</sup>F.Y.M. Pharm, Dept. of Pharmaceutical Chemistry, V.E.S.C.O.P, Chembur,  
Mumbai-400074

<sup>2</sup>Assistant Professor, V.E.S.C.O.P, Chembur, Mumbai-400074.

### Abstract:

Rotavirus is one of the leading causes of severe paediatric diarrhoea, and vaccination against rotavirus is an important component of prevention strategies. As of the end of 2018, 98 countries had introduced rotavirus vaccine on a phased, regional, or national basis, and four rotavirus vaccines had been prequalified by the WHO. Rotavirus vaccines have been shown to have significant impact on diarrheal morbidity and mortality in diverse geographies, though effectiveness tends to be higher in higher resource settings. Several rotavirus vaccines are under development, with some pursuing new strategies.

### Introduction:

Diarrhoeal diseases are one of the leading causes of illness and death in children < 5 years of age, particularly those in low income countries and cause > 500,000 deaths per year globally. Before the 1970s, the causative agent in many cases of infantile gastroenteritis was not identified, but a breakthrough occurred in 1973 with the identification of virus particles in duodenal biopsy samples from children with severe diarrhoea and in faecal samples from children with acute diarrhoea. The name **rotavirus** was assigned to this newly discovered virus because of its distinct morphological appearance.

Rotaviruses are non-enveloped double-stranded RNA (dsRNA) viruses that have a complex architecture of three concentric capsids that surround a genome of 11 segments of dsRNA. The RNA segments encode six structural viral proteins (VP1, VP2, VP3, VP4, VP6 and VP7) and six non-structural proteins (NSP1-6).

The proteins in the mature virus particle determine host specificity, cell entry and enzymatic functions necessary for the production of viral transcripts, and contain epitopes that generate immune responses. The non-structural proteins are involved in genome replication and antagonism of the innate immune response (a particular role for NSP1) and include the viral enterotoxin NSP4.

Ten different rotavirus species (A–J) have been classified on the basis of sequence and antigenic differences of VP6. Species A rotaviruses are the most common cause of infections in children. Human species rotavirus strains that have a high degree of genetic homology with animal strains have been identified, and direct animal-to-human transmission can occur, particularly in low-income countries.

### Vaccines

WHO has prequalified four Rotavirus vaccines: **Rotarix** (GlaxoSmithKline Biologicals; prequalified in 2009), **RotaTeq** (Merck & Co., Inc.; prequalified in 2008), **ROTAVAC** (Bharat Biotech, Hyderabad, India; prequalified in 2018), and **ROTASIIL** (Serum Institute of India PVT. LTD., Pune, India; prequalified in 2018).

Rotavirus vaccines have been well tolerated and no increase in serious adverse events associated with Rotarix, RotaTeq, or ROTAVAC are seen. However, one consideration with all live-attenuated, oral



rotavirus vaccines is the potential risk of intussusception, a rare but serious cause of bowel obstruction in which one portion of the intestine invaginates into another portion, in some cases necessitating surgery.

### **RotaTeq:**

RotaTeq is an oral vaccine used to help prevent rotavirus infection in children. The vaccine contains 5 live rotavirus strains (G1, G2, G3, G4, and P1) along with parts of porcine circovirus (a virus that infects pigs) types 1 and 2. The most common side effects reported after taking RotaTeq were diarrhoea, vomiting, fever, runny nose, sore throat, coughing, and ear infection.

### **ROTARIX:**

ROTARIX is a vaccine indicated for the prevention of rotavirus gastroenteritis caused by G1 and non-G1 types (G3, G4, and G9). The vaccine is approved for use in infants 6 weeks and up to 24 weeks of age. It is available as a vial of lyophilized vaccine to be reconstituted with a liquid diluent in a prefilled oral applicator. Each 1-mL dose contains a suspension of at least 10 median Cell Culture Infective Dose (CCID50) of live, attenuated human G1P8 rotavirus.

### **New WHO- Prequalified Rotavirus Vaccines:**

In 2018, two new rotavirus vaccines were prequalified by WHO: **ROTAVAC** and **ROTASIIL**. These vaccines are currently available in India for use, soon they will be available globally.

### **ROTAVAC:**

ROTAVAC is a monovalent G9P naturally attenuated, live oral rotavirus vaccine. It contains live rotavirus 116E strain prepared in Vero cells. ROTAVAC is licensed with a low dose volume (0.5 mL) & permits complete vaccine uptake by eliminating infant spit-ups. It confers protection from birth.

### **ROTASIIL:**

ROTASIIL, a pentavalent bovine-human re-assortant live attenuated oral vaccine, has the unique feature of being heat-stable in its lyophilized form, retaining stability for up to 18 months at 40°C. The vaccine needs to be reconstituted with diluent, which is Citrate Bicarbonate Buffer. The reconstituted vaccine can be used up to 6 hours, if stored at a temperature between 2-8°C. Three doses of vaccine are scheduled to be administered to infants 4 weeks apart, beginning at 6 weeks of age.

### **Conclusion:**

Rotavirus infections are a leading cause of severe, dehydrating gastroenteritis in children less than 5 years of age. Development of vaccines for preventing the infection have proven to be useful. The oral vaccines are easy to administer to infants and also these vaccines are said to show no severe adverse effects. WHO has prequalified four Rotavirus vaccines, which are globally available and will prove beneficial for the prevention of infection. Rotavirus vaccines have a proven track record of impact, balanced with a favourable risk-benefit profile.

## References:

1. Crawford, S., Ramani, S., Tate, J. et al.; Rotavirus infection; Nat Rev Dis Primers 3; 2017; Article 17083.
2. Burke, R. M., Tate, J. E., Kirkwood, C. D., Steele, A. D., & Parashar, U. D.; Current and new rotavirus vaccines; Current Opinion in Infectious Diseases 32(5); 2019; 435–444.
3. 'About ROTAVAC®'; Bharatbiotech.
4. 'Product Information - RotaTeq'; MerckVaccines.
5. 'Products Supplied Overseas - Rotasil - Rotavirus Vaccine, Live Attenuated, Oral (freeze-dried)'; Serum Institute.
6. 'Rotarix, oral suspension', gsksource.

## PRE-NATAL TOXICOLOGICAL EVALUATION FOR MONOCLONAL ANTIBODIES

Pradnya Shinde-Korlekar<sup>1</sup>, Santhanalaxmi Kumaresan<sup>2</sup>

<sup>1</sup>Asst. Prof. Dept. of Pharmacology, V.E.S.C.O.P. Chembur, Mumbai- 400074

<sup>2</sup>T.Y. B. Pharm, V.E.S.C.O.P. Chembur, Mumbai- 400074

Monoclonal antibodies are laboratory-produced molecules engineered to serve as substitute antibodies that can restore, enhance or mimic the immune system's attack on cancer cells. They are designed to bind to antigens that are generally more numerous on the surface of cancer cells than healthy cells. For monoclonal antibodies, the immunological properties of the antibody should be described in detail, including its antigenic specificity, complement binding, and any unintentional reactivity and/or cytotoxicity towards human tissues distinct from the intended target. Relevant animal species for testing of monoclonal antibodies are those that express the desired epitope and demonstrate a similar tissue cross-reactivity profile as for human tissues. This would optimize the ability to evaluate toxicity arising from the binding to the epitope and any unintentional tissue cross-reactivity.

Developmental toxicology is referred to as teratology. Teratogenicity testing is designed to provide general information concerning the effects of prenatal exposure on the pregnant test animal and on the developing organism. The major manifestations of developmental toxicity include 1. Death of the organism, 2. Structural abnormality, 3. Altered growth, and 4. Functional deficiency. Three types of toxicity studies are commonly used to investigate the Reproductive toxicity of new agents-The first is the Fertility and Early Embryo Developmental Design (FEED) in which the drug is administered from before mating until implantation, second is the Embryo-Fetal Developmental (EFD) studies, with administration from implantation to cleft palate closure, while the third is the Pre and Post-Natal Design (PPND), with administration from cleft palate closure until weaning. There are profound differences in maternofetal transfer of IG between species, with extensive gestational transfer of maternal IG in primates via the chorioallantois placenta as well as in rabbits and guinea pigs via the inverted yolk sac splanchnopleure. Therefore, Nonhuman primates (NHP) are most frequently used for Developmental and Reproductive Toxicity (DART) testing when rodents and/or rabbits are not pharmacologically relevant species. The NHP species most frequently used for general toxicity and for DART testing is the Cynomolgus macaque.



Macaques have similar reproductive physiology, endocrinology, and monthly menstrual cycles similar to that of humans. The duration of spermatogenesis is 40–46 days compared to 64–74 days in humans. Organogenesis is also similar in humans and macaques. Analyses indicate that Cynomolgus monkeys are the most frequent animal species used in the preclinical studies of marketed mAb drugs.

Animal species	Cross reactivity	
	Evaluated	Cross-reacted
Cynomolgus monkeys	39 (100%)	32 (82%)
Rhesus monkeys	3 (8%)	3 (100%)
Chimpanzees	5 (13%)	3 (60%)
Marmosets	3 (9%)	2 (67%)
Dogs	9 (23%)	1 (11%)
Rabbits	18 (46%)	3 (17%)
Guinea pigs	3 (8%)	1 (33%)
Rats	30 (77%)	0 (0%)
Mice	31 (79%)	2 (7%)

Therapeutic (MAbs) are most commonly of the IgG1 subclass, which is transported most efficiently to the fetus. They require active transport across the placental barriers via a specific receptor-mediated mechanism regulated by the syncytiotrophoblast and the fetal capillary endothelium. Exposure of the neonate to IgG antibodies results primarily from exposure in-utero, and due to the long half-life, typical of such antibodies, this exposure is likely to persist for some time after birth. The fetal IgG concentration starts to rise smoothly until week 18, with a sharp increase in total IgG levels observed between weeks 22 and 26 of gestation. Major toxicity caused by monoclonal antibodies on the fetus is Oligohydramnios which significantly increases the risk of fetal morbidity and mortality as it predisposes to pre-term delivery also these cross the placenta during the second and third trimester and are functional in the fetus and causes lymphopaenia reported at birth in children exposed to Rituximab in-utero.

Based on their structure, MoA and treatment populations, many therapeutic MAbs will directly interact with the immune system. Potential adverse effects of certain MAbs include infusion reactions, cytokine release syndrome, immune-related effects, infections, autoimmunity, and/or effects related to the target antigen that are not a desired part of therapy. Because of the complexity of the embryo-fetal development, including the maternal-fetal interactions during gestation, it is important to understand the mechanism of toxicity and test the toxic effect in more than two species before confirming the substance to be a developmental toxicant.

## References:

- Frank R. Brennan, Laura Dill Morton, Sebastian Spindeldreher, Andrea Kiessling, Roy Allenspach, Adam Hey, Patrick Müller, Werner Frings & Jennifer Sims; Safety and immunotoxicity assessment of immunomodulatory monoclonal antibodies; mAbs 2(3); 2010; 233-255.
- Stewart J.; Developmental toxicity testing of monoclonal antibodies: An enhanced pre- and postnatal study design option; Reproductive Toxicology 2; 2008; 220-225.
- ICH guideline S6(R1) Preclinical Safety Evaluation Of Biotechnology-Derived Pharmaceuticals; FDA; May 2012.

## FELDAN SHUTTLE, A NOVEL APPROACH TO INTRABODY DELIVERY: PROPOSED TREATMENT FOR MDR TUBERCULOSIS.

*An Immunoinformatics based design concept to provide improved Quality of Life to MDR TB Patients.*

Ashish R. Jhangiani<sup>1</sup>, Habil Hirkani<sup>2</sup>

<sup>1</sup>L.Y. B. Pharm, V.E.S. College of Pharmacy, Chembur, Mumbai- 400074.

<sup>2</sup>T.Y. B. Pharm, V.E.S. College of Pharmacy, Chembur, Mumbai- 400074.

## ABSTRACT:

**Objective:** The enzyme Shikimate Kinase has been identified as a promising target for newer therapeutics to treat MDR Tuberculosis. The present approach aims to deliver highly specific and effective protein cargo intracellularly to disrupt the Shikimic Acid pathway. Until the advent of the Feldan Shuttle, the delivery of proteins to the cytosolic domain was a challenge. The ease in delivery of intracellular protein cargo implies that the protein cargo quintessentially can be considered an intracellular antibody i.e. an Intrabody.

**Method:** The current proposition suggests the use of Feldan Shuttle and Immunoinformatics in tandem to deliver potent therapeutic cargo (intrabodies) intracellularly to specifically identified epitopes on Shikimate Kinase. The epitopes were identified for B-Cells (Linear and Discontinuous), CD8+ T-Cells & CD4+ T-Cells. These epitopes were then docked against the predominant human immunoglobulins IgG and IgA.

**Conclusion:** Present work is a design concept which can lay the groundwork for design of more prolific Intrabodies and also presents opportunities to identify more targets to provide assistance with the management of MDR TB.

**Key Words:** Shikimate Kinase, Feldan Shuttle, Intrabody, Immunoinformatics.

## INTRODUCTION:

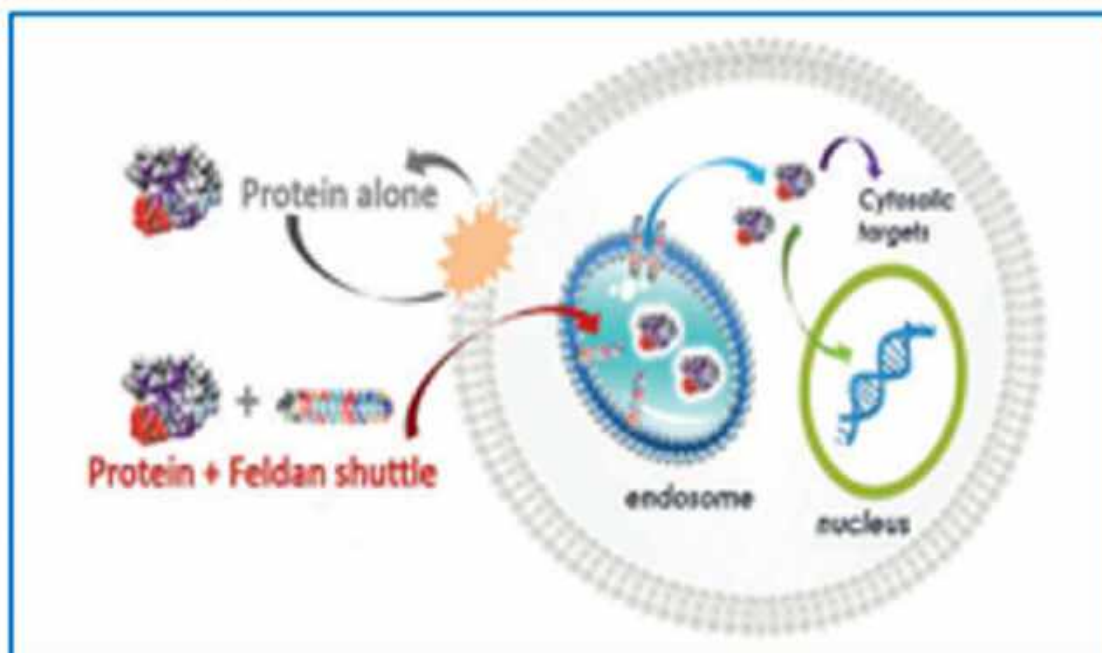
The Feldan Shuttle is a novel delivery system primarily designed to deliver protein- based therapeutic cargo into the intracellular domain. Primarily designed as an experimental treatment strategy for Cancers, we propose its repurposing with specific modifications to provide therapeutic alternatives in case of MDR/ XDR/ PDR cases of *M. tuberculosis* infection.



The Feldan Shuttle Comprises of:

COMPONENT	FUNCTION
Cell Penetrating Peptide (CPP)	To provide for the basic attachment and penetration into the Bacterial Pathogen. To be isolated from Mycobacteriophage for TB.
Endosomal Leakage domain (ELD)	To provide for the escape of the Therapeutic cargo from the Human host's immune system. Increases target specificity of the formulation.
Histidine Rich Domain (HRD)	To provide pH buffer to enhance stability of the formulation in the microbial micro-environment in presence of biofilms.
Linkers	To provide non-covalent attachment basis to the components of the Shuttle.
Therapeutic Cargo (Protein)	The Intrabody. Intended for intracellular therapeutic activity. To be designed using the Immunoinformatic tools. Provides for more efficient targeting and eradication of the pathogenic population.

## SCHEMATIC: FELDAN SHUTTLE ACTIVITY- INTRACELLULAR DOMAIN:



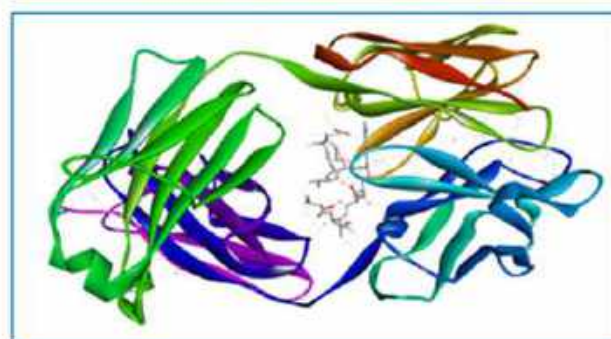
## Identification Of Epitopes:

The target enzyme was subjected to a battery of tests so as to identify peptide regions that can be identified by the Cellular components of the human immune system. Both discontinuous and linear regions were identified with respect to B- Cells, followed by T- Cells. Open their identification the best regions with highest antigenicity marking scores were selected and docked against standard Immunoglobulins- IgA and IgG. Future aspects allow for the design of more specific intrabodies intended to target more significant enzymes that constitute the Conserved Domain of the microorganism in question. In the current work, we have focused only on discontinuous B-Cell Epitopes as they provide for distinct and more marked binding regions i.e. have a length of at least 10 Amino Acids. The epitopes were further subjected to RAMPAGE ANALYSIS, so as to establish their torsional stability. The T-Cell (identified for both MHC-I and MHC-II) epitopes for the present target did not show promising results and hence were not considered for molecular docking.

## PROTEIN- PROTEIN INTERACTION: MOLECULAR DOCKING.



**EGVRRTGNTV+ IgG**



**EGVRRTGNTV+ IgA**

ADVANTAGES:	CHALLENGES:
Higher Target Specificity.	Lack of in-vitro & in-vivo correlation.
Newer Therapeutic Avenues.	More Expensive as compared to Conventional Therapeutics.
Reduced Chances of Acquired Resistance.	Administration requires RMP Assistance.

## References:

1. Us Patent Application. Guay D, Guidice Td, Lepetit-Stoffaes Jp, Polypeptide-Based Shuttle Agents For Improving The Transduction Efficiency Of Polypeptide Cargos To The Cytosol Of Target Eukaryotic Cells, Uses Thereof, Methods And Kits Relating To Same. Pub. No.: Us 2016/0298078 A1; Pub. Date: Oct. 13, 2016.
2. Mohammed Mahfuz Ali Et Al. In-Silico Modelling And Immunoinformatics Probing Disclose The Epitope Based Peptide Vaccine Against Zika Virus Envelope Glycoprotein. Indina J. Pharm Biol Res' 2014; 2(4): 44-47



## EFFICACY AND SAFETY OF PCSK9 MONOCLONAL ANTIBODIES - A REVIEW.

Rajashree S. Hirlekar<sup>1</sup>, Komal D. Madhav<sup>2</sup>, Siddhi Kanade<sup>2</sup>.

<sup>1</sup>HoD, Dept. of Quality Assurance, V.E.S.C.O.P., Chembur (E), Mumbai-400074.

<sup>2</sup>F.Y.M Pharm-2019, Department of Pharmaceutics, V.E.S.C.O.P., Chembur (E), Mumbai-400074.

### **Introduction:**

Over the last three decades, monoclonal antibodies (MAbs) have made a striking transformation from scientific tools to powerful human therapeutics. As of March 2017, FDA has approved approximately 60 therapeutic MAbs which are currently under evaluation in various phases of clinical trials.

Cardiovascular disease is the leading cause of morbidity and mortality worldwide. Circulating low density lipoproteins (LDL) are implicated in development and progression of atherosclerosis and represent a target of therapeutic intervention. Whilst statins have demonstrated considerable benefit in reducing rates of cardiovascular disease, there remains a significant residual risk, which may be attributed to a failure in achieving target LDL cholesterol (LDL-C) levels despite optimum statin therapy.

Proprotein convertase subtilisin/kexin type 9 (PCSK9) is a regulatory protein first discovered in 2003 which can regulate LDL levels. The PCSK9 protein induces LDL receptor degradation thereby reducing hepatic clearance of LDL. Naturally occurring missense mutations resulting in PCSK9 gain of- function result in a rare form of autosomal dominant hypercholesterolaemia with accelerated atherosclerosis and premature coronary artery disease. Common loss of function mutations has also been found resulting in low circulating LDL-C levels conferring benefit in preventing cardiovascular disease. Such finding has sparked interest in the PCSK9 protein as a therapeutic target and has led to the development of MAbs against PCSK9.

### **Applications of Human MAbs:**

1. MAbs are approved for the treatment of diseases belonging to various systems like cardiovascular, respiratory, hematology, kidney, immunology and oncology.
2. MAbs are approved for the treatment of orphan diseases or indications such as paroxysmal nocturnal hemoglobinuria as well as cancers and multiple sclerosis where hundreds of patients are treated and even diseases such as breast cancer, asthma and rheumatoid arthritis where millions are being treated.
3. Proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors are novel drugs that have been developed since the discovery of the PCSK9 protein in 2003.
4. In addition to statin treatment they (PCSK9 MAbs) reduce low density lipoprotein cholesterol (LDL-C) to unprecedented levels and have shown encouraging results in improving cardiovascular events.

### **Reasons for CVD:**

- High level of blood cholesterol (hypercholesterolemia), especially LDL (bad cholesterol)
- Low level of HDL (good cholesterol)
- High levels of C-reactive protein, a marker for inflammation
- High blood pressure
- Others like smoking, diabetes mellitus, lack of exercise, obesity, high blood cholesterol, poor diet and excessive alcohol consumption.

## Mechanism of action of PCSK9:

The PCSK9 protein is secreted chiefly by the hepatocyte, with smaller quantities being expressed by the intestinal epithelia, nervous tissue and renal mesenchyme. PCSK9 secreted by the liver primarily controls circulating serum LDL levels. PCSK9 prevents the LDL receptor from translocating to the cell surface by either acting as a ligand to cell-surface LDL receptors post secretion, or by binding directly to nascent LDL receptors pre-secretion mediating lysosomal destruction of the LDL receptor.

**Mechanism of action of human PCSK9 MAb:** Anti-PCSK9 monoclonal antibodies bind the catalytic and pro-domains of the PCSK9 molecule, blocking its activity and preventing its binding to the LDL receptors. This halts degradation of the receptor leading to increased LDL clearance with a significant lowering of LDL particle numbers and LDL-C. Mechanisms for this lowering are yet to be elucidated. It has been shown that PCSK9 binds to LDL but not HDL. Three monoclonal antibodies against PCSK9 have been extensively evaluated in phase II and III clinical trials; alirocumab, evolocumab and bococizumab. Alirocumab and Evolocumab are approved by the Food and Drug Administration (FDA) and the European Medicines Agency (EMA) for the treatment of patients with primary dyslipidemia, but Bococizumab has been discontinued due to development of antidrug antibodies, which blunted its efficacy. Alirocumab and Evolocumab (IgG2) is a human MAb that binds to PCSK9. Alirocumab inhibits the binding of PCSK9 to low-density lipoprotein (LDL) receptor, thus increasing the number of LDL receptors available to clear LDL thereby lowering LDL levels as mentioned in fig. 1

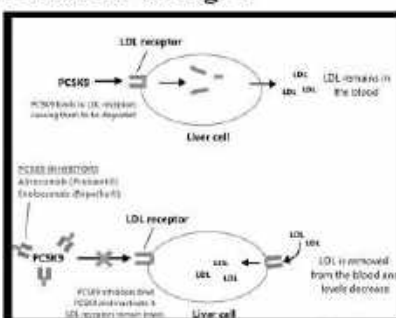


Fig.1. MOA of human PCSK9 MAb

## Conclusion:

The immunogenicity reactions, cytokine storm and failure of treatment have reduced with the use of fully human MAbs. PCSK9 monoclonal antibodies have shown promising results in lowering LDL-C to unprecedented levels and reducing cardiovascular events. These drugs exhibit a good safety and tolerability profile with no major side effects. PCSK9 monoclonal antibodies could be used more in both the primary and secondary prevention of cardiovascular disease, subject to cost effectiveness assessment.

## References:

1. Zohaib Iqbal, et al; Efficacy and safety of PCSK9 monoclonal antibodies; Expert Opinion on Drug Safety 18(12); 2019; 1191-1201.
2. Surjit Singh, Nitish K. Tank, et al; Monoclonal Antibodies: A Review; Current Clinical Pharmacology 13(2); 2018; 85-99
3. Jun Xiaoa, et al; PCSK9: A new participant in lipophagy in regulating atherosclerosis?; Clinica Chimica Acta 495; 2019; 358-364.



## EDIBLE VACCINES - A REVIEW.

Mrs. Rashmi Wani<sup>1</sup>

Asst. Professor, Dept. of Pharmaceutical Chemistry, V.E.S.C.O.P., Chembur (E), Mumbai - 074.

An advanced technique for delivering vaccine antigens is the use of inexpensive, oral vaccines. Edible oral vaccines offer exciting possibilities for significantly reducing the burden of diseases like hepatitis and diarrhea particularly in the developing world where storing and administering vaccines are often major problems. Plants produce vitamins, proteins or other nourishments that act as vaccines against certain diseases are called as Edible Vaccines. The concept of edible vaccines was developed by Arntzen in the 1990s. In 1998, it was proven, for the first time, by National Institute of Allergy and Infectious Diseases (NIAID) that significant immunogenicity can be induced safely by an edible vaccine, utilizing the concept of plants as bioreactor.

Once the plant, fruit, or plant derived product is ingested orally, it stimulates the immune system. Specifically, it stimulates both the mucosal and humoral immune systems. Edible vaccines are currently being developed for Measles, Cholera, Foot and Mouth Disease, HIV, Anthrax, Hepatitis B and C, stopping autoimmunity in Type I Diabetes. Following table illustrates differences between Traditional and Edible Vaccines

Traditional Vaccine	Edible Vaccine
Too expensive	Low cost
Restricted to manufacturer for production	Easy to produce and purify
Require sterilized production facilities or the biosafety standards.	Does not require sterilized production facilities or the biosafety standards
Expensive and tedious methods to store	Easier and less expensive to store
Require strict refrigerated storage	Do not require strict refrigerated storage
If developed from cultured mammalian cells can lead to contamination with animal viruses	No chance of contamination as plant viruses cannot impact humans
As there is possibility of proteins reforming into infectious organisms, safety of individuals is at risk	These are subunit preparations, not involving attenuated pathogens, and improve the safety as compared to traditional vaccines

Edible vaccines are considered as **Pharmafood** which is a food source that supplements to health by fighting diseases. The plants being an efficient vector play crucial role for vaccine production. Moreover, as a result of numerous antigens being integrated, the M-cells are randomly stimulated; leading to the possibility of second-generation vaccines.

Edible vaccines are genetically modified crops that contain added "immunity" for specific diseases.

### Plant Vaccines

Experimental edible vaccines, which offer protection against diarrheal disease, have been developed by using potatoes, rice, and bananas as vaccinating agents. A modified Ti plasmid is capable of integrating into the plant cell genome and transforming the plant. The mature, transformed plant produces glycosylated microbial proteins in the edible parts of the plant.

After the plant part is ingested, antigens stimulate local immunity, systemic immunity, or both. During the last decade, different types of efficient plant-based expression systems have been studied and more than 100 different types of transgenic proteins containing plant derived vaccine antigens have been successfully expressed in different types of plant tissues. Edible vaccines show some interesting positive effects including decrease in potential hazards such as toxic compounds, responses to allergy, risk of attenuated strains reverting to pathogenic strains and also provide long lasting immunity.

Examples of edible vaccines include transgenic plant derived vaccinogens includes hepatitis antigen in potatoes and a lettuce, a rabies antigen in tomato and E. coli thermolabile enterotoxin in corn. Moreover, carrots, maize, banana and other food plant-based production systems have been involved in the development of edible vaccines. The first human clinical trials for a transgenic, plant-derived antigen were approved (Food and Drug A) and performed in 1997.

#### **Advantages:**

- 1) They can be produced in mass hence economical.
- 2) They can be administered by eating the plant hence processing and purification can be eliminated.
- 3) Process of distribution and transportation is eliminated
- 4) They trigger the body's first line of defence i.e. Immunity at Mucosal surface

#### **Disadvantages:**

- 1) Selection of plant with stable antigen production could be a difficult task, time-consuming, and expensive
- 2) Possibility for hypersensitive reaction, development of oral tolerance to vaccines and also difficulty in the administration of the standard dose are additional limitations
- 3) Plants are living organisms that change, so vaccination continuity can't be guaranteed
- 4) Digestion of macromolecule antigen protein within the stomach due to extremely acidic pH.

Types of transgenic proteins including plant-derived vaccine antigens have been successfully expressed in different types of plant tissues. Positive effects of edible vaccines (EVs) include the decrease in potential hazards such as toxic compounds, responses to allergy, and risk of attenuated strains reverting to pathogenic strains. The EVs have several functions for either individual animals or humans by providing long lasting immunity without risk of relapse reaction and faulty techniques; there exists a lack of information regarding their production and mechanism of action

#### **Following are certain methods for transformation of DNA or gene into plant:**

1. Plasmid or vector carrier system.
2. Micro projectile bombardment/ gene gun method.
3. Chimeric virus method.
4. Electroporation method

#### **Different plant hosts for Edible Vaccines:**

1. Banana: Due to their sterile nature genes from one banana do not pass to another hence they are preferred for EV. Proteins are not destroyed even if bananas are cooked and it can be eaten as raw.



2. Rice: Genetically altered rice is used for Cholera treatment. A strain of rice can serve as vaccine and can last for more than one and half year at normal temperature.
3. Maize: It generates protein which is used to develop Hepatitis B vaccine. Degradation of protein occurs on cooking of Maize is one of the disadvantages.
4. Potato: It is used to combat Norwalk virus (stomach virus) which is spread by contaminated water, food and causes abdominal pain and diarrhoea
5. Tomato: It has been reported that it serves as a vector to develop vaccine against Anthrax, Rabies and HIV/AIDS. It can be grown quickly and it boosts immune response due to high vitamin A content but it spoils easily hence could not be stored for longer time

### **Conclusion:**

Edible Vaccines are the stepping stones in the branch of biotechnology for developing the effective vaccine particularly useful for immunization of people in developed countries. Edible plant-based Vaccines are future hopes and may lead to a future of safe, more effective and inexpensive immunization.

### **References:**

1. Elisa Ferrante, David Simpson; A Review of progression of transgenic plants used to produce plant bodies for human usage; Journal of Young Investigators 1; 2001; 4:56-61.
2. Swapna L.A. Edible vaccines: A new approach for immunisation in plant biotechnology, Sch. Acad. J. Pharm 2013; 2: 227-232.

## **BIOSIMILARS: AN EMERGING TREND IN PHARMACEUTICAL INDUSTRY**

Meghna Kuradia<sup>1</sup>, Mrs. Vidhi Bhatia<sup>2</sup>

<sup>1</sup>F.Y.M.Pharm [Quality Assurance], V.E.S.C.O.P., Chembur (E), Mumbai 400074.

<sup>2</sup>Asst. Professor, V.E.S.C.O.P., Chembur (E), Mumbai 400074.

### **Introduction:**

Biotechnology has led to the development of more and more Biologics. But the process is complex and expensive. Developing cheaper yet equally efficacious and safe biological product has become a necessity. This has led to the development of Biosimilars. Biologics are a therapeutic agent manufactured in living system such as microorganisms, plant or animal cells using Recombinant DNA Technology. Biosimilars are basically a bio-therapeutic product which is similar in terms of Quality, Safety and Efficacy to an already licensed reference bio-therapeutic product. They are legally approved subsequent versions of innovator biopharmaceutical products made by a different sponsor following patent and exclusivity expiry of the innovator product. Because of structural and manufacturing complexities, Biosimilars are considered as similar but not generic equivalents of the innovator biopharmaceuticals. Biosimilars are fundamentally different from generic chemical drugs. Differences include the size and complexity of the active substance, and the nature of the manufacturing process.

### **Future Aspects:**

Will the Biosimilar products deliver on value and cost savings expectations while ensuring quality?



By way of background, in 1984 the Drug Price Competition and Patent Term Restorations Act (Hatch-Waxman Act) provided an abbreviated pathway for drug companies to reproduce the innovator sponsor drug after the patent expiry period. By demonstrating comparability to a “brand/reference listed drug product in dosage form, strength, route of administration, quality and performance characteristics, and intended use” [FDA], by meeting the definition criteria, the drug manufacturer is allowed a shorter approval process known as Abbreviated New Drug Application (ANDA). This approach is effectively based on demonstrating science equivalence and manufacturing reproducibility, thus minimizing the more expensive development, clinical and non-clinical testing required for an innovator’s drug approval. The pathway derived as a by-product of the Hatch-Waxman Act forged a step forward in achieving pharmaceutical drug savings as today more than 50% of prescription drugs are filed with generic products [FDA]. In 2010, the Patient Protection and Affordable Care Act (Affordable Care Act) was signed into law to amend the Public Health Service Act (PHS Act). The Affordable Care Act follows the pathway of allowing the pharmaceutical Biologics product to be developed, manufactured and marketed via an abbreviated approval process, under the designation of Biosimilars. This pathway is known as the Biologics Price Competition and Innovation Act (BPCI Act). Biosimilars are not an exact replica of the innovator product; they can either be ‘highly similar’ or ‘interchangeable’, unlike the generic products that are required to be a ‘generic copy’ of the innovator product. It is the differences between the BPCI Act and Hatch-Waxman Act that puts into question the true quality attributable to the Biosimilar products as a viable replacement for the branded Biologic products. In conclusion, the BPCI Act will serve as a catalyst in driving cost reduction in the Biologics therapeutic area by affording manufacturers, physicians, insurers and patients a menu of options at reduced costs. It will increase health care access by providing patients with alternative therapies in general and reduced biosimilar in particular, all with the assurances of a well-defined quality expectation set forth by documented guidance and regulations.

## Biosimilar Products:

1 <sup>st</sup> approved product by EMEA (2006)*	US-FDA	India
1. Omnitrope: Biosimilar to Genotropin	1. Zarxio (filgrastim-ndz)- 2015	2. Biovac B (Hepatitis B vaccine)- 2000
2. Valtropin: Biosimilar to Humatrope		

## Conclusion:

Unlike generic pharmaceuticals, biosimilars are not identical to their originator products. The highly unpredictable nature of immune responses against biopharmaceuticals urges the appropriate testing of biosimilars based on sound scientific rationale and rigorous experimental evidence. The extent of biosimilar entry into the healthcare market as alternative therapeutic options remains open to speculation. Physicians, pharmacists, health care fund holders and patients will need to balance possible cost savings of biosimilar medications versus the risk of iatrogenic complications.

## References:

1. El-Bakry, L. (2017). The Future of Biosimilars. International Journal of Drug Delivery. 9. 01. 10.5138/09750215.1930.
2. Simon D. Roger 1 and Ashraf Mikhail 2 1 Department of Renal Medicine, Gosford Hospital, Gosford, Australia; 2 Renal Unit, Morriston Hospital, Morriston, Swansea, South Wales, UK.



# *“A World of Endless Possibilities”*



An interview of Dr. Rahul Mandlik was conducted by Ms. Priyanka Ghosh, Ms. Shruti Kulkarni and Ms. Gauravi Parab.

He is a Medical affairs manager with 13 years of experience. He provides accurate, balanced and timely scientific expertise to functional areas such as sales & marketing, clinical development, regulatory affairs, formulation development, pharmacovigilance based on objective evidence, extensive experience, and voice of the customer.

## **1. Could you elaborate on your career path?**

While I was pursuing my Master's in Pharmacology, I got an opportunity to work in basic clinical research. That's how I got to know about medical affairs and I picked up this opportunity out of many

during that period. In 2006 I started my career by working in Meyer Organics which is in Thane. At that time medical affairs was a newly emerging field. But my inclination towards clinical pharmacology was a result of my interest in medical affairs. I worked in Meyer Organics for 3 years. Working there helped me gain a massive amount of knowledge about medicines and nutraceuticals. After that I moved to Ahmedabad and joined Torrent Pharmaceuticals. There I got to learn about new therapy areas, from acute to chronic non communicable diseases which are becoming quite prevalent today. Followed by that, in 2017 I got an opportunity from overseas and that's how I ended up joining Shalina healthcare in Dubai where I am getting an opportunity to interact with various healthcare professionals. Since the past two years I'm associated with the "Medical Affairs Professional Society" which is a non-profit organization based in USA for medical affairs' professionals from across the globe. And I'm one of their Executive Leadership Committee members for Europe, Middle east and Africa region.

## **2. What is the job profile of a medical affairs manager?**

Medical affairs is a corporate function. It comes under either research and development or sales and marketing depending upon the organization. We being medical affairs professionals' lead and guide our sales and marketing team on building scientific strategies. We evaluate and screen the new product pipeline. Senior healthcare professionals are engaged to gain valuable insights. We check the potential of the products, like



whether it is filling the gap in the company's portfolio or if it is meeting the therapy need. We also participate in medical conferences and events to present the research work of our companies. Medical writing is another important facet where we are involved in writing for publications. Medical affairs is very closely involved in phase four clinical trials. We call them observational studies. We help in gathering real life evidences as we evaluate how company's products are utilized by the patients. Medical affairs is moreover associated with marketing department thus we also keep on travelling to meet healthcare professionals so as to keep ourselves updated with the trends in the pharmaceutical field. Last but not the least we train pharmaceutical sales and marketing teams on scientific product and therapy knowledge

### **3. How are regulatory and medical affairs different from each other?**

Regulatory affairs is an equally important function of any pharmaceutical industry. However, regulatory affairs and medical affairs are different. Their profiles and requirements are different. Regulatory affairs plays a major role in product registration in market. It basically looks at the technical aspects of a product. Medical affairs requires qualifications such as Master's in Pharmacology where as in case of regulatory affairs, Master's in quality assurance or quality control or sometimes pharmaceutical analysis works as well. And talking about expertise in regulatory affairs, one should be well versed with the technical knowledge of the product. When it comes to medical affairs' expertise, one needs to have knowledge about the clinical aspects of the product. The role of regulatory affairs comes into picture before the product is launched into the market. Medical affairs' role starts after the product is launched. They are very closely connected and the roles do overlap every once in a while.

### **. What skill set must one possess to be successful in this field?**

When it comes to skill set, the three parallels to be considered are personal level, academic level and professional level. Students should work on developing their soft skills. On the academic level students should have an interest in subjects like anatomy, physiology, pathophysiology biochemistry, microbiology and most importantly pharmacology. Students should develop an interest in scientific writing and extensive reading along with patience and understanding. They should have a command over their speaking skills as in medical affairs field they will be training several medical representatives. learn new languages and they should be street smart to make their mark in the marketing profession.

### **5. Could you brief us about the challenges one usually faces in this field?**

In medical affairs field one starts facing challenges right from the beginning that is from the time of seeking jobs. After all, the competition is just not restricted to the pharmacists but also to medical doctors. Another challenge is that one needs to develop and sustain a research and marketing perspective both, simultaneously. This is because medical affairs as a field lies in between research and development and marketing field. You get data from your RnD team, you make it presentable and pass it on to the marketing team so that they can use it for product promotions. Lastly performance measurement is one of the debatable topics which occurs as the major challenge in medical affairs. In sales and marketing performance measurement is based on the target set and achieved where as in medical affairs it is looked upon as a qualitative factor and not as a quantitative factor.



# Breathe

*The art within you must live!*



*Namrata Relwani L.Y.B. Pharn*



*Dikshita Dhammaraj S.Y.B. Pharn*



# Breathe

The art within you must live!



Saloni Maindani  
S.Y.B. Pharm



Shruti Kulkarni  
S.Y.B. Pharm



Dias Gadre  
F.Y.B. Pharm



Sweety Chheda  
T.Y.B. Pharm



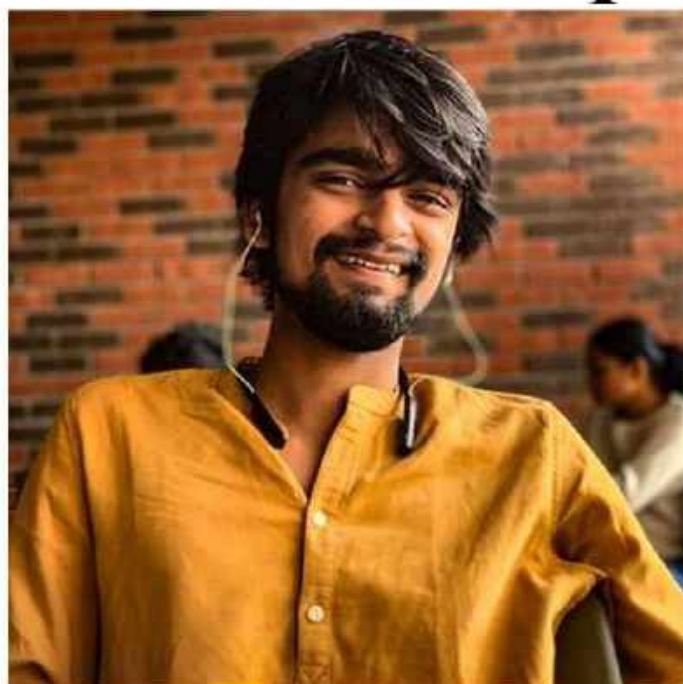
Saloni Maindani  
S.Y.B. Pharm



Gauravi Parab  
Sybpharm



# *“Scaling the galaxy One Step at a Time”*



An interview of Mr. Aryan Mishra was conducted by Ms. Priyanka Ghosh, Ms. Shruti Kulkarni and Ms. Gauravi Parab.

Mr. Aryan Mishra is a nineteen-year-old amateur astronomer. He has taught around 300,000 kids in India and across the world, and has also been invited as a speaker, guest in various events - TEDx being the highlight of 2017.

He has been featured in the New York Times with Dr Neil deGrasse Tyson for a remarkable contribution in the field of astronomy.

He has also achieved a silver medal for "The Pramerica Spirit of Community Award 2018" and has also been nominated for the "International Children's Peace Prize" in 2016 for making a positive difference in the community through volunteer community service.

**1. You discovered an asteroid with your friend, Keeerti Vardhan at a very young age. Could you brief us about your journey?**

Since I was a kid, I had a penchant for the night sky. We used to sleep on the terrace. And I would always find myself wondering that why exactly were there stars in the sky. I approached my school teacher with this query and eventually also got to know that I had an Astronomy club in my school. I was in sixth grade back then. I ended up joining the club and realized that astronomy was indeed my passion. In the year 2005, I bought my first telescope by saving up my pocket money. In 2014 me and my friend ended up discovering an asteroid using a software graph. This happened in a cybercafé because I didn't have a laptop back then. The journey wasn't easy but my passion kept me going. My very first life lesson was that you need to prove to the world that you have it in you to walk the extra mile and do everything that is needed to be done when you decide to chase something unconventional. My parents have never been to school so when they found out I wanted to pursue "astronomy" a subject which is often labelled as a branch of study which doesn't have a future in India, the cycle of proving that "This is me" started right at home, with my own parents.

**2. When did you realize that astronomy is your passion? Are you pursuing it academically as well?**

The first time I felt a telescope and looked through it, I knew that I had found my calling. And it only made sense to pursue my passion academically as well. Currently I am doing my BSc In Physics from Ashoka University. After this I plan on doing my Postgraduation in astrophysics.

**3. What does a regular day in your life look like?**

I am just like any other nineteen-year-old kid. So, a regular day isn't very eventful. I am usually in college. On Fridays my lectures get over by four o'clock in the evening. So, I usually take a flight around seven- eight o'clock and go to schools or colleges where my lectures or talks are scheduled at. I even have a startup. It is called "Spark Astronomy". It basically builds astronomy labs in school. So, I supervise the work related to that. I do all of this through the weekend after which I take an early morning flight back home in time to attend my Monday morning lectures. Having said this I would also like to add that whatever I do isn't very extraordinary. I happened to stumble across my passion at a young age and I strongly believe that anyone who recognizes their passion possesses the capacity to do similar things in their line of interest.

**4. Is there anything you are currently working on?**

Yes. I am working as the Principle Scientific advisor to the government of India. I basically work with the government in making astronomy labs in schools. As I previously mentioned about my startup, "Spark Astronomy", it basically acts as the medium to achieve this purpose. In a nutshell this is how I make my living.

**5. You have met a number of astronauts like Sunita Williams, Rakesh Sharma amongst others. Is there anything remarkable about these encounters that you would want to share?**

The thing is that people who have achieved exceptional heights through hard work will always be down to earth. They precisely know the amount of work which has gone into them being where they are today. They have been acquainted with success and failure equally at some point in their lives which is why they know the importance of both and that is what makes them who they are today.

**6. Is there any message you would like to give to the younger generation regarding astronomy or otherwise?**

Astronomy is one of the most beautiful and oldest sciences in the world. I know people prefer jobs that offer stability and security and this branch of study might not fit the bill for most. But I believe that in a developing country like India, Astronomy is currently booming. It is not necessary that one needs to work in this field to experience its beauty. One could also pursue this as a hobby or a passion. The field is very progressive in itself and is becoming bigger and better as we speak.

With best compliments from  
Gratian Coutinho



# VESCOP WHIZ KIDS

our academic toppers

F.Y.B Pharm



S.Y.B Pharm



T.Y.B Pharm



L.Y.B Pharm



M Pharm  
Quality Assurance



M Pharm  
Pharmaceutical  
Chemistry



M Pharm  
Pharmaceutics



# *Heads Tales*

*"Leading the way, Leaving footsteps for tomorrow"*

## **STUDENT COUNCIL**

**PRESIDENT: SAYLI KHARKAR**

Being the President of the Student Council 2019-20 has been the most educative and trying experience I've had in my four years in this college. The things I've learned, the people I've met and worked with, and the situations me and my team have faced together has played a key role in moulding me into the person I am today. The Council has meant a great deal to me since my first year and to be able to lead this committee comes as a moment of pride and satisfaction for me. The Council 2019-20 holds extreme potential with some of the most talented and hard-working people I've met. We've strived to bring some change through small steps forward, and we hope that we can deliver a Spectrum that will be remembered by all.

**SECRETARY: JAY JUTHANI**

The journey so far has been extremely overwhelming for me. This being my very first year in the Student Council, I had been looking forward to a year which was going to be equally educative and memorable. Deciding to take up this position has truly been the best decision. Working with a team which has time and again proven its mettle and has been a staunch supporter since day one has only made me more affectionate towards each and every one of them. The finish line is right around the corner and what I am looking forward to the most is crossing it with every person who believed in me enough to make all of it happen!

## **IPA**

**PHO HEAD AND VICE CHAIRPERSON:  
NIKEETA PALANDE**

"Build a team that is better than you!" This has always been the motto that has pushed me to build a concrete team and end my four years with a grand and successful Rx 2020. My journey from a cell member in PRO to the Vice-Chairperson and Public Health Officer in IPA-MSB-SF has been a bumpy ride. It has nurtured and shaped my personality and has helped me grow into a much more confident and better version of myself. If being the Vice-chairperson gave me an opportunity to work with different committees and helped me gain insight into the entire process required to organize a grand event like Rx, heading a committee like Public Health Office that is solely dedicated towards healthcare and overall wellbeing has made me more responsible and has helped me contribute towards the betterment of our society. I have made invaluable memories throughout these four years being a part of this organization, ones I will cherish for the rest of my life.

**EDITOR – IN – CHIEF: MEGHA JEESON**

"Leadership is not about a title or a designation. It is about impact, influence and inspiration". These humbling words by Robin Sharma have helped me stay true to myself throughout my journey in IPA-MSB-SF. The past three years have been a period of transformation for me. It has not only nurtured my creative and editing skills but has instilled in me a great deal



of discipline, maturity and decisiveness. As the Editor-in-chief for the year 2019-20, I had the opportunity to convert my dreams into reality in the form of the 21st edition of the annual magazine of IPA-MSB-SF, Panache. I believe that exploring different avenues is very important to understand one's strengths and weaknesses and my role in the Students' council and RC VESCOP over the four years have proved to be the eye openers I needed them to be.

### **ROTARACT CLUB**

**PRESIDENT: NEHA DEMBRANI**

Leading a Club like the Rotaract Club of VES College of Pharmacy was always something I had only dreamt of. From my very first year in college I have actively been a part of it and have seen it grow with me. This club means so much to me as well as to all the other members who have worked tirelessly to elevate the club and to take it to glorious heights that no amount of vocabulary would be enough to measure its merit in our lives. This club has not only taught us Community Service but it has also helped us in developing our professional as well as personal lives. And the entire credit goes, not only to the members but also to the college authorities for letting us dream and do it.

### **PHO**

**PHO STUDENT HEAD: KIRTI SAWANT**

Back in 2017, when I got selected for the post of a mere Committee member in PHO, all I knew about it was that it works for the welfare of the people thus I was quite sure if the world is a game of "select your niche" my niche was going to be this committee. So, with trembling hands, nervous brows and a racing heartbeat I gave the interview and got in. Little did I know that getting in would be the least of my worries because every campaign conducted in PHO challenged me, challenged me as a team-mate,

student, friend and eventually as a human being. Prioritising my work, communicating with people, acquiring the art of being compassionate at all times, facing obstacles and resolving my way through them are just a few of the many things I have procured throughout this journey. On the other hand, with hardships came satisfaction, the feeling of serving others, mostly those who were truly in need was as surreal as it could get. Seeing people with a smile on their face and knowing that somehow, we made that happen made me more determined to be good at what I do. After working for 3 years, leaving this committee is like leaving a job that gave a significant meaning to my life. In the end, I would like to add that the committee turned a lazy, shy, awkward teenager into a hardworking, compassionate woman and I will always be grateful for the same.

### **ALUMNI COMMITTEE**

**STUDENT CO-ORDINATOR:**

**HARDIK SHAH**

The success of any institution can be measured by the contribution its alumni makes for the betterment of the society. Trotting on these lines, it gives me great pleasure to be a part of a committee which keeps the students and the alumni connected. Not only does it help us to learn a lot of valuable things, but it also gives us a glimpse into what lies ahead. The networking opportunities and career building tools achieved from the alumni are unparalleled. Backed by a highly talented and hard-working team, we only expect the Alumni committee to go from strength to strength, making the Alumni meets ever so memorable.

# Rx WINNERS



## Solo Singing 1st

*On most days,  
music is the ultimate saviour.*



## Pharmaquiz 1st

*If your weapon is knowledge,  
victory is your middle name.*



## Paper Presentation 1st

*Come the morrow,  
wisdom shall be your  
greatest confidante*



## Mehendi 1st

*Intricacy and Art are  
two sides of the same coin.*



## Solo Singing 2nd

*On most days,  
music is the ultimate saviour.*



## Dream City 2nd

*When reality terrifies,  
fiction soothes.*



## Solo Dance 3rd

*Dance like no one's watching.*



## Dub it Out 2nd

*Interpretation is the key to  
most things in life.*



## Graffiti 3rd

*Art is the only hope you need  
to survive*



# Rx WINNERS



## Stand up Comedy 1st

*And... Mic Drop!*



## Wordsworth 1st

*If words were the ultimate survival kit,  
would there be enough of us alive?*



## Video Journalism 1st

*Capture these fleeting moments  
because that's all that  
you are entitled to*



## Buzzwords 2nd

*Choose your words wisely.*



## Fashion Show 2nd

*Three spoons glitz and  
an extra serving of glamour please!*



## Our Story 2nd

*Breathing life into stories.*



## PHO 2nd

*Giving back to the society  
every once in a while.*



## Nukkad Natak 3rd

*Lights. Camera. Action.*



## Group Dance 3rd

*The pack survived and  
the winning streak continues.*

# Rx WINNERS



## Rink Football 1st

*Talking about football in a rink,  
Our girls stole the trophy with a wink!*



## Table Tennis Singles 1st

*Spin it to Win it!*



## Table Tennis Boys Doubles 1st

*Serve it, smash it,  
win it, love it!*



## Carrom Singles 1st

*As cover follows the queen,  
a winner is born!*



## Counter Strike 1st

*Every strike has brought them  
closer to their goal!*



## Carrom Mix Doubles 2nd

*Life to them in terms  
of a carrom match is-  
Just aim and fire!*



## Carrom Girls Doubles 2nd

*One Team, One Spirit!*



## Carrom Singles 2nd

*Spectacular performances are  
preceded by spectacular preparation*



## Chess 3rd

*You can't undo the moves but  
you can make the next step better!*



## Rx WINNERS & Other Achievements



### Rink Football 3rd

*Small arena but a bigger dream,  
Persistent efforts have brought  
glory to the team!*



### Throwball 3rd

*Teamwork makes  
the dreamwork!*



### Vivekni Group Singing 1st

*Music is the  
greatest therapy!*



### Chem - o - doodle 1st

*Because art is the  
freedom of the soul!*



### Chem - o - Quiz 1st

*Unlocking knowledge at  
the speed of thoughts.*



### Pharmanest Poster Presentation 1st & 3rd

*Self-belief and hard work will  
always earn you success!*



### Aesthetica Doodle 3rd

*Doodling the intricacies of life!*



*Winner at Pratishtha  
by Shah Anchor Engineering college*

*Winner at Spurthi by SPIT college*

*Runner-up at Enthusia VJTI  
-a national level tournament*

*3rd place in Dimension - Kelkar college*

*4th place all over Mumbai University*

# *Avishkar 2020*



Vivekananda Education Society's College of Pharmacy has shown commendable participation in AVISHKAR 2020. With the support of Principal Dr. Supriya Shidhaye, Teacher coordinator Dr. Sandip Zine and Student coordinator Ms. Kshitija Phatak all the students took appreciable efforts in making the project scheme and presenting it well.

The college has immense pleasure to have several students who won the University round:

1. Mrs. Pradnya Korlekar (Assistant professor) 1st place in teaching level
2. Ms. Shivali Tank and Ms. Kshitija Phatak (M.Pharm) 1st place in PG level
3. Mr. Sumit Gupta (M.Pharm) 3rd place in PG level

The winners were selected to present their projects and represent Mumbai University at the State Level Avishkar Grand Event.

As the students stood at the end of the final round with boosted confidence and equally strong project proposals in their hand, no one was able to stop them from being the best in the State, and they ended up winning 2 more Gold medals at the state level as well.

1. Mrs. Pradnya Korlekar (Assistant professor) 1st place in teaching level
2. Ms. Shivali Tank and Ms. Kshitija Phatak (M.Pharm) 1st place in PG level

The credit of this achievement also goes to their guide and our beloved Principal madam Dr. Supriya Shidhaye for her constant support and motivation.

The State level competition is further followed by West zonal and National level competitions. The college is hopeful that the students will make everyone proud at the Nationals as well.

The event has been successful for years as it inculcates a research attitude amongst students and generates a novel thinking ability and it will continue to do so in the upcoming years as well.

- Kshitija Phatak (S.Y.M.pharm)



# *"Giving back to the community"*



Mrs Purnota Bahl is the founder and CEO of Cuddles Foundation, an organisation which aims to provide holistic nutrition to underprivileged children undergoing cancer treatment.

## **1. From the corporate world to immersing yourself in social work, how was this transition and what were the challenges that you faced?**

I quit my corporate career in 2013 to start Cuddles Foundation. Through my own personal experience as a donor at TATA Memorial I had learnt about the need for nutrition to cure cancer in children. The first challenge we faced was that we were starting with a blank slate. There was no organisation doing what we were - focusing on nutrition for children with cancer, that we could fall back on for guidance and benchmarks. But we were lucky that we had a

solid team of advisors - all the doctors at TATA Memorial who were championing the cause, had our back from a clinical perspective.

The second challenge we faced was raising funds. Because nutritionists had to be paid and for a program to scale you need to be able to attract and retain good talent. Besides, we weren't going to stop at counselling. We had to provide children free food, supplements, and ration. Because we believe that all a family should worry about is helping their child live. One of the key challenges the doctors and we were facing when we started out was a high rate of treatment abandonment because of the side effects that children faced during chemo. Compounded by malnutrition these side effects would debilitate a child further and parents would take them back home without completing the treatment. In a study conducted by TATA Memorial in 2014-15, they noticed that the treatment drop-out rates had fallen by 86% thanks in part to the nutrition support provided by us.

## **2. How did the Cuddles Foundation come into existence?**

While doing my research I found out that we were losing kids in treatment, not to cancer but to malnourishment. There are doctors for adults and children alike, usually one resident nutritionist was shared amongst all wards, adults and children alike. But the needs of a child especially one battling with cancer and malnutrition are very different from those of adults. I started with pooling in money to buy supplements or sponsoring meals on some days. Around the same time that I was doing my bit, the doctors at TATA were investigating a treatment protocol that required nutrition to work hand in hand with medicine. I realised a more sustained approach was required, if one had to have a lasting impact on the nutritional status of a child or her ability to fight cancer. Thus, was born Cuddles Foundation.



### 3. How does the foundation work on a day to day basis?

For children with cancer, nutrition can mean the difference between life and death. When they are well-nourished, children are able to tolerate treatment and experience reduced side-effects to chemotherapy. This makes them more likely to complete their treatment and get better sooner. We have seen that where nutrition works together with medicine, treatment dropout rates have fallen by 86%.

Our FoodHeals Program is built to deliver expert clinical nutrition to children seeking cancer treatment at government and charitable cancer hospitals. It's built on 4 pillars:-

**1. Building capacity:** We recruit, train and place our clinical nutritionists in paediatric wards of these hospitals to work alongside doctors so medicine and nutrition work hand in hand.

**2. Nutritional Counsel:** Last year alone, we conducted over 1.5 lakh counsels. Our nutritionists help diagnose a child's nutritional status - whether they are Severely Acutely Malnourished, or moderately or otherwise. They are aided with the FoodHeals App we've built. Based on the diagnosis they prepare a diet plan customised to the eating patterns and cultural habits of the child and her family.

**3. Food Aid and supplements:** We provide them with dietary supplements, eggs, bananas, dry fruits, ghee, and a monthly ration basket for the whole family including grains, cereals, pulses and kitchen supplies, based on the need and the diagnosis.

**4. Caregiver Support:** We also support parents of our kids with knowledge on how to care for their child at home, make smarter food choices for the family and build healthy

eating habits for their kids and themselves. We also conduct monthly parent support group meetings. While all this happens at the hospital, our resource team including our teams from fundraising, marketing, communication and finance make sure our programs and nutritionists have the right knowledge and financial support to deliver our mission of making sure every child fighting cancer has access to nutritional support.

### 4. In 2016, Cuddles was recognised by the President of India with the "National award for child welfare". This was a major milestone for the foundation. Are there any goals you have set for the foundation in the upcoming years?

Yes. That was a big milestone. Our mission is to make sure every child fighting cancer has the right nutrition needed to overcome it. We have collaborated with 29 government and charity cancer hospitals in 19 cities across India to make sure we're there when a child walks in for treatment at a hospital. Using a multi-pronged approach of nutritional counselling and nutritional aid we tackle a simple but ignored aspect of a child's successful recovery from cancer - her nourishment. Because FoodHeals. Over 50,000 children are diagnosed with cancer every year in India. 8 out of 10 children who are malnourished, lose the fight to cancer. An alarming statistic given that Childhood Cancer is largely curable, world over. In the years to come, we need to be there in more hospitals reaching out to all the children fighting cancer. New tertiary cancer centres are coming up soon across the country, we have to be there. We are grateful for the support we have received from individuals - rich or poor - in furthering our mission. And from corporates and trusts for fuelling our work with their funds. We are also investing in learning and training, looking at ways to bring clinical nutritional knowledge to medical practitioners so nutrition and medicine can work together.

### 5. If someone wants to join this foundation, is there a provision? If yes, how does one go about it?

As we expand our work to reach more children and hospitals, we will need more hearts and minds to join us in this mission by supporting us with their wealth, voice, talent and influence. If someone wants to join our team, they can visit our website - we need many more clinical nutritionists to join us as we expand.

Link to apply - <https://www.cuddlesfoundation.org/careers/> You can also support our mission by adopting the nutrition of a child or a full hospital - [www.cuddlesfoundation.org/donate](http://www.cuddlesfoundation.org/donate). To partner or collaborate with us, please drop us a line at [team@cuddlesfoundation.com](mailto:team@cuddlesfoundation.com)



A dark, atmospheric illustration of a library. The room is filled with tall, wooden bookshelves that stretch from the floor to the ceiling, packed with books. Several lit candles are mounted on the shelves, casting a warm, flickering light. Two wooden ladders are leaning against the shelves; one is on the left side, and the other is in the center. The floor is dark and appears to be covered in a patterned rug or carpet. In the bottom right corner, there is a small, dark wooden chair. The overall mood is quiet and scholarly.

# LITERARY SECTION

# YOU

The girl next to you peeps into your laptop and giggles. It's been an hour into your literature class already and a blank word document stares right back at you. You are falling short of inspiration. 'Is anything even remotely inspiring?' You wonder. You live in a world where Will Bettelheim wasn't lauded enough for the love he carried within himself. 'He was damaged and mentally unstable', your subconscious whispers. Instead, you think about the boy with the crooked teeth who sits next to you in your math class. You wonder if he is still afraid of the guys from senior year who constantly bully him. You make a mental note to ask him if he is okay the next time you meet. But how do you ask people if they are okay? Is there a catalogue which specifies the parameters which deem you okay? You can't stop fidgeting with the ring your best friend gifted to you a while back. It reminds you that you haven't spoken to her in a while. Maybe you'll text her later tonight? Or maybe you'll just push it forward for another day. The clock keeps ticking. The girl next to you is already on her third page and you are still as clueless as ever. You reflect back onto the fight you had with your mother last night. Maybe you should have apologized? Maybe you shouldn't have taken out your angst on her. You rest your forehead against the table. Your mind is buzzing and you can't focus on anything.

Your phone vibrates in your pocket. It's your mom reminding you to take your meds. You text her back with an "I am sorry for last night".

This is you, isn't it?

You do not like to fight. You can't stand people being annoyed at you. You like to please people. But is validation that important?

Maybe it is.

You carry so much love within yourself and yet on most days you wonder if there is enough of it.

But your love can't fuel everyone and everything. Why don't you understand that?

Maybe you will someday.

You are grappling for some sense of direction but there is none.

It feels like the end is lost. But didn't your friend once tell you that the end is what you make of it?

Maybe coffee is what you need. "Maybe a friend?" your subconscious sneers.

You ignore her.

You plug in your earphones. Maybe music is what you need. Rekha Bhardwaj croons in an almost delicate voice about love, loss and belonging.

Nothing is put into perspective yet. But maybe, just maybe you need to stop running. Maybe it's time you let people in. Maybe it's time you realize that on some days it's okay to not be okay.

It's okay to stop running after people you thought were supposed to be here.

It's okay to stop feeling responsible for everything and everyone.

It's okay to be disappointed sometimes.

It's okay to be flooded with emotions and not enough poetry to make it go away.

It's okay to just breathe and get through the day.

The girl next to you is packing up her things and most of the students have already left.

Maybe you'll brainstorm again later tonight. Maybe it'll be another one of those nights when procrastination will be the easy way out.

But as long as you decide to put yourself first, you'll be okay, right?

**-Priyanka Ghosh**  
**T. Y. B. Pharm**



# For the Love of Music

Heinrich Heine once said, "Where words leave off, music begins". When people cannot express themselves through words, music can. Most people are raised with music. It becomes a part of their lives, a central element in their existence. It gets them through thick and thin. Some songs truly express what you feel in that single moment. Some songs define your life in a single sentence. Whatever your mood is, music has the ability to enhance it or to completely change it. It's magical. As a form of art, it's not only creative, it's visionary. To make music, it takes more than a beat and a lyric, it takes a muse, a story; it takes passion.

Motivational music inspires people in a way Ted talks cannot. It brings people together. It seeps through the hearts of people. It lets your emotions flow like water and ironically helps you find aspects of yourself you never knew. Music of different kinds attract different crowds. Some music brings energy into every room. Some bring peace. It heals people. Music is so powerful that it's immune to age and language barriers. It is a language in itself. It helps in filling the gap in communication where words can't justify what you feel. Your choice of music expresses your character. It makes people jump off their feet and be themselves. It gives them courage. It has an impact on people's lives like no other. It comforts people more than people themselves. More importantly, it tells a story. You associate it with memories, nostalgia, inspiration and maybe even a part of yourself to it. Einstein once said, if he weren't a physicist he would have been a musician. Music is a means for people to express themselves, it gives them a voice. It is therapeutic for the soul and most importantly it makes a difference in the world.

-Amisha Undavia  
F. Y. B. Pharm

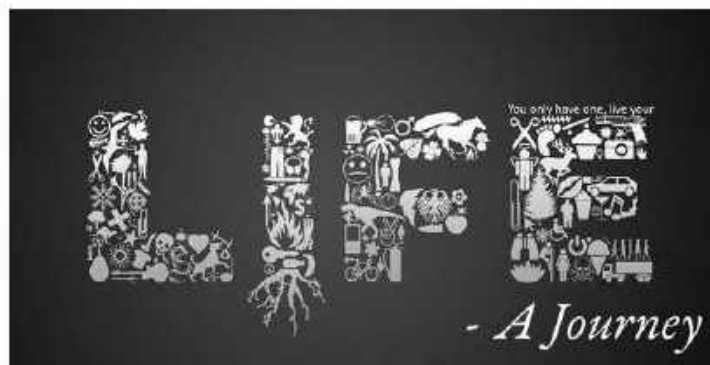


## Be someone's Krishna

Everyone needs a Krishna. I could have stopped here because the statement has the power to change the entire world. Work is a burden and the only thing we want is for the burden to disappear. But do we really need motivation? After all, it is work that needs to be done. Arjuna, a true warrior and leader, the finest of the archers. He was worthy to know the difference between right and wrong. Yudhishtir - an idol for the youth. As bitter as the truth could be, he would never lie. But when the moment strikes, all your beliefs can be shaken. It may be a strength; but also a weakness. People believe in things, say religion, as long as it benefits them. Most wouldn't sit for an 'aarti' but are the first in line for the prasad! That is where people go wrong. Funny isn't it? But I guess everyone out there can relate. Religion is so much more than just its practices. It has values and ethics. Mahabharata was fought for Satya and the only thing affecting the result was 'Krishna'. He pushed Arjuna and guided him. Arjuna showed faith. Yudhishtir was the one who almost lied to his guru Dhrona when asked if Ashwathama was dead, he said 'narovakunjarova'. This is 'shraddha'. Why would he lie? It's because Krishna asked him to. Why did Arjuna fight his brother? Because Krishna asked him to. Be someone's Krishna

-Jay Juthani  
T.Y.B. Pharm





The journey of life is mysterious and challenging as it brings forth new experiences each day. Every little experience we go through teaches us something new with which we can bring enduring worth to our lives. And instead of allowing ourselves to learn from them, we hold ourselves back and avoid them.

We shouldn't lose hope or be disheartened by minor setbacks; remember some situations are weird and beyond our control. The gloom of grief and misery, though it may seem never-ending, will eventually disappear. All the inner conflict that we face is temporary. It is a few moments that may discourage us or lower our spirits but there is a new day ahead to start all over again.

We often tend to feel that we have no control over our lives. We feel that the future is controlled by luck or the movement of celestial bodies. We build or break our future by the quality of our thoughts, words and actions. Some people live in the past, brooding over wrong decisions and unaccomplished goals, without realizing that the past cannot return. Some worry about the uncertain future and thus forget to enjoy the present conditions. Happy are those who live for today.

We sometimes feel helpless in difficult situations. Let us not forget that we do have some authority over the circumstances in our lives, so we should inculcate the ability to make our own decisions. Our decisions are sensible when they are independent of influence or bias. Life is not at its best when one nurtures the desire of satisfying one's ego. We can develop the art of joyful living through a proper interpretation of our experiences.

What should matter to us is whether we are on the right track. The right track will be accompanied by feelings of doubt, failure, impossibility and disappointment initially, yet one

can stay on the right path with the determination to be righteous. The right approach towards every aspect of life is only possible with realistic behaviour. Righteous people are not deterred by success, failure or the opinions of others.

All face problems but we should never give up in our efforts to solve them. We need to learn from our mistakes and be aware of our nature as well as that of the world around us. We need to keep learning, improving and developing one's potential to become self-reliant, responsible and content enough to experience this beautiful journey through life.

**-Nazish Khan**  
**F.Y. B. Pharm**



## *The Ocean & The Shore*

There's a person, so much like the ocean - Vast, deep and dark beneath.

And here I am, on the shore. Wondering, about it's depth and ways to reach its core.

Being scared yet curious about its existence  
'Dive In'.

But Oh! My heart, with utmost firmness, says  
"No, darling! Don't."

Paying no attention to it I turn towards my brain with a ray of hope, expecting it to guide me right.

Brain yet again chuckles. But, this time with a hint of conspiracy in its tone.



"JUMP!", it orders.

"No! Please don't do this! You'll regret it! You'll cry! It'll hurt! You'll drown!"

My heart cries this time in a voice that shrivels in pain. But to its dismay, I was already inside the heavenly water body.

Moments later, I find myself swimming with all the butterflies in my belly. I head towards the core. Observing every single drop of water dance on my skin and touch my soul. It makes me wonder if I'll ever get over this reminiscent touch. If I'll ever be able to forget the magnificent side this dark place has built over the years, even with no sign of sunshine here.

As this euphoria of getting deep into this resplendent ocean starts prevailing my mind, I suddenly feel this terrifying pull. I feel a scary grasp around my hands, my legs, my chest.. my brain!

With no clue what's happening around, I try to push away the force bound to me at the moment just to get the view of the core that I was about to reach. Although the pressure of the depth tried to choke me to death, I wanted to breathe. Sigh. Not because I was running out of air in my lungs but just to stay alive for a moment - to see, the ocean at it's best and prove the world wrong that called it terrifying and life-taking. I wanted to live in that moment of joy and victory

But, before I could try, I saw the blues of the ocean fading. Everything around me slowly turned black. My lungs burn, trying to inhale as much as air it could. My hands and legs shiver. My head spins. Still neglecting every other thing, without any thought, my eyes finally open up sparkling with anticipation...

To see myself lying on the shore. Half dead-half alive! Heart surely whispered in my ears filled with water, which were in no mood to take the grief

"None belong to the ocean. Whoever gets lost finds their way back eventually. None can stay there. The ocean holds onto none. This is where you belong sweetie! THE SHORE."

**-Tanvi Shivnekar**  
F. Y. B. Pharm



## That Girl

The clouds were showering happiness that day,  
As if the beautiful rainbow poured colours in my life,  
I could observe the difference between my thoughts and the reality, Oh Lord! No comparison to your creativity!  
From the small grains of the sand till the large, hefty mountains,  
From the small rain droplets till the massive ocean spread beyond the land,  
From the little ants to the large elephants and from small insects to the birds taking flight,  
My glimpse at every corner of the world pacified my thirsty eyesight!

I had spent thirteen years of my life in complete darkness,  
Even then I could feel everything I heard and touched,  
I had known people for their voice, touch and the vibes they brought,

But I could never firmly help the lies to get caught.  
Now was the time to say goodbye to my black specs and the stick,  
Till now it had supported me unconditionally and gave me identity,

When I had lost all my interest in this life without vision,  
One covered the defect in me while the other helped me stand by my mission!

Today I opened my eyes to see the world,  
But I saw my entire world in my parent's eyes,  
I was now that girl who got back her eyesight,  
Just like a flower blooming because of the sunlight!

**-Shruti Kulkarni**  
S.Y. B. Pharm



## *What does being a Pharmacist Mean to me?*

Pharmacists are people who work in the field of health sciences; focusing on safe and effective use of medicines. As a pharmacist, it is necessary to understand the concept of biochemical mechanisms, the action of a drug on the human body and potential drug interactions.

A pharmacist has to interact with and convey the specialized knowledge to patients, physicians and other health care providers. Being a pharmacist helps to carry out research on drug molecules which in turn enhance and improve the overall life of an individual. They are responsible for the quality of medicines supplied to the patients, ensuring maximum beneficial effects and minimum side effects.

Being a pharmacist means that I can ensure that the medications are being used appropriately to achieve optimal patient outcomes. I want to become a pharmacist because it teaches me how to interact with the community while dispensing the medications. One also gains insight into the relationship between lifestyle and medical conditions. Thus, being a pharmacist can provide me with the perfect opportunity to help individuals and I consider it as the best way to connect with people.

- Safina Shaikh  
F. Y. B. Pharm

## *The Effect of Pharmaceutical Industry on Human Race*

Since ancient times, pharmaceuticals have played an important role in healing mankind. Drugs of natural origin were primitive healers of many diseases and adverse health conditions. Extracts and juices of many medicinal plants were, and still are, employed for healing.

Ayurveda (ancient science of life) was an ancient system of Indian medicine. It spread its roots nationwide and laid the basis for the development of other systems of medicine.

With modernization and globalization as well as ancient and modern pharmaceutical techniques, the application of ideas has become easier; the formulation and manufacture of drugs have become more efficient.

Currently, allopathic medicines are popularly used to cure dangerous diseases. Populations at risk of being infected by deadly diseases can be healed with advanced formulations or medicaments. Also, the fact that medicines are made available to many parts of the world, especially remote areas is equally interesting. These medicines are aiding current treatments that are beneficial to the patient.

Pharmaceutical industry has taken quantum leaps and bounds and is progressing gradually towards the elimination of healthcare issues with profound research in the field of pharmaceuticals, pharmaceutical chemistry and pharmacology. Scientists have now synthesized new drugs and novel drug delivery systems. Even though every system of medicine has its disadvantages, its advantages are manifold. Improving the quality of health and decreasing death rate has always been the aim of every system of medicine.

Therefore, the effects of the pharmaceutical industry are widespread and have played a crucial role in enhancing the health of individuals and move towards complete elimination of affliction.

-Archit G. Kadu  
S. Y. B. Pharm



# Mumbai

"More dreams are realized and extinguished in Mumbai than any other place in India."

Mumbai is full of dreamers and hard-labourers, starlets and gangsters, stray dogs and exotic birds, artists and servants, fisher folk and millionaires and a lot more. It has India's most prolific film industry, some of Asia's biggest slums as well as the world's most expensive home and the largest tropical forest in an urban zone. Mumbai is India's financial powerhouse, fashion epicentre and a pulse point of religious tension.

One of the many bewitching things about Mumbai that continues to intrigue me, are the local trains. Mumbai local trains may seem like just a mode of transportation to some. But to many, it is a life line, a depiction that holds on diversity, a plethora of human emotions reflecting moments of joy and sorrow. Right from boarding the train, you see how optimistic people are, when you hear them saying the following lines, "Arey bhai, andar badho, bahot jagah hai, poora train khali hai" in a rush where even standing on two legs becomes a struggle. Yes, it's very crowded; sometimes frustrating and tiring. Train rides are cumbersome and many times, not so enjoyable. But so is life and Mumbai local depicts it very well. It is not just a mode of transportation, it is a journey.

Be it a vegetarian or non-vegetarian, the dishes in Mumbai boast of rich taste, fieriness and impressive flavours. The cuisine of Mumbai covers a large assortment of interesting, authentic and zesty dishes. Of all Mumbai's street snacks, the vada paav (my personal favourite) has grown to be the darling of the masses. The city promises some heavenly street food that includes a wide range of appetizers, seafood dishes, chaats, traditional Maharashtrian and Konkani dishes and desserts!

Historical monuments in Mumbai radiate a magical vibe to indulge you in its thrilling past and significance of its presence today. Such places in Mumbai includes Gateway of India, Chhatrapati Shivaji Maharaj Terminus, Hotel Taj, Elephanta Caves, Haji Ali Dargah, Rajabai Clock Tower, Siddhivinayak Temple, Kanheri Caves, and many other tourist attractions in Mumbai. These places are like its assets dating back to a thousand years, and each one of them accounts for a different story for their existence. People from across the borders visit Mumbai to have a glimpse of the magnificence of these historical places.

Another interesting feature of Mumbai is the architecture. A magnificent array of temples dating from the 8th century A.D. and earlier reflects the cultural and religious mixtures to be found in the city. Generally when you talk about Mumbai you think of all the seven islands of Colaba, Fort, Byculla, Parel, Worli, Matunga, Mahim which have been formed into a single landmass through successive reclamations. It is quite misleading to call Mumbai an island today; for it is no more an island in the full sense of geographical expression; it is a peninsula attached to the mainland. Mumbai was once known as Bombay. The name Mumbai may have been derived from "Mumba Aai" or "Maha Amba", the patron goddess of the Kolis, after whom the city was originally believed to be named.

Mumbai has kept pace with the march of civilization, both Indian and foreign. In its long chequered history, Mumbai has proved to be the Gateway of India for admitting into its mystic hinterland all that has been outstanding in the culture and civilization of different people. Mumbai, today, is nothing if not cosmopolitan and this confluence of varied currents and cross-currents has given it a unique position of being the most cosmopolitan city in the country.

-Nirja Chavan  
S. Y. B. Pharm



## मुन्तज़िर

मेरी आँखों में एक रुस्वाई छिपी है, लफ़्ज़ों में एक दर्द....

दशत-सा तन्हा है सफ़र, भटकती है रूह दर-ब-दर....

किसकी रहनुमाई ढूँढ़ रहा हूँ....

मैं खुद को क्यों भूल रहा हूँ....

मुन्तज़िर हूँ मंज़िल नहीं मिलती किसी मोड़ पर,

बेखबर-सा बे सब्र-सा भटक रहा हूँ हर डगर

कि ख़्वाबों की तेज़ी ने फासले ही बक्शे हैं

और हौसलों के परवाज़ आज भी कच्चे हैं

नज़रों के सामने से ओझल होता देखा है हर मंज़र....

खुदको मगर मुब्तला पाया है वक़्त के धागों में अक्सर

मेरी हर हार से मेरा कोई सबक क्यों मरासिम नहीं....?

क्योंकि किसी भी जीत का सबब इस सफ़र में मुनासिब नहीं....

इस ना-उम्मीदी के दौर में माज़ूर हूँ

साज़ खामोश हैं मगर फरियाद से मामूर हूँ....

फिर भी सोचता हूँ की ज़िंदगी इक दिन मुक्क़र्र होगी...

इस दिल की हर आरजू पूरी होगी....

-आशिष राजेश झांगयानी

फाइनल ईयर बी. फार्म.





## "शाळा"

आठवण त्या जुन्या विचारांची, फळ्यावरच्या  
सुविचारांची

मराठीतल्या कविता आणि अंकलिपीतल्या अलंकारांची!

शाळेतला प्रत्येक तो दिवस नव्याने आनंद द्यायचा,  
लाकडाच्या बाकावर आणि मातीच्या मैदानात मैत्रीची  
बाग फुलवायचा!

विषय तसे सगळेच आवडीचे वाटायचे,

कारण तेव्हा शिकताना कसलेच दडपण नसायचे!  
प्रत्येक वर्षी शाळेचा पहिला दिवस नको नकोसा  
वाटायचा,

कधीही न वाचलेल्या पुस्तकातला प्रश्न परीक्षेत मात्र  
वेरी म्हणून भेटायचा!

तो प्रत्येक दिवस आणि प्रत्येक क्षण आजही पुन्हा  
एकदा शाळेत बोलवतो,

शिक्षकांशी असलेले नाते आणि खेळाचा तास आजही  
आठवतो!

आजही वाटते की पुन्हा ते दप्तर आणि पाटी घेऊन  
शाळेत जावं,

मित्रांच्या चौकटीतील ते बालपण आज पुन्हा नव्याने  
जगावं!

सोनाली गुडाळकर

(टी.वाय.बी.फार्म)



## "सांभाळा त्या वसुंधरेल"

सांभाळा त्या वसुंधरेला, मग तीही सांभाळेल तुम्हाला.

नकोच मोका त्या काळाला. रोखा त्या प्रदूषणाला,

धोका होईल भावी पिढीला.

सांभाळा त्या वसुंधरेला, मग तीही सांभाळेल तुम्हाला.

आमंत्रण ते उष्णतेला, वितळवतील त्या हिमनगाला,

समुद्र गळतील मग भूमीला.

सांभाळा त्या वसुंधरेला, मग तीही सांभाळेल तुम्हाला.

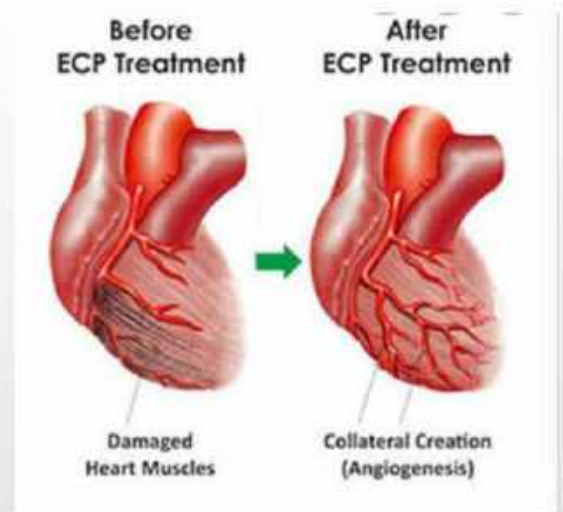
कोण समजावेल तुम्हाला, पिंजून काढलं जरी ब्रम्हांडाला,

कुठे न जीव तुम्हा मानवाला.

सांभाळा त्या वसुंधरेला, मग तीही सांभाळेल तुम्हाला.

सायली कदम

(टी.वाय.बी.फार्म)



It's a treatment to be taken by any person who has crossed 35 years of age.

As the arteries start getting rigid and less elastic coupled with the after effects of an erratic lifestyle a person becomes prone to early heart attacks, stroke, paralysis which could eventually lead to people being handicapped or partially bed ridden.

This is where we come in. The machine EECP which is at our hospital at Raksha starts developing new arteries known as collateral which simply means a supporting add on blood supply to all the vital organs of the body as any kind of malfunction to these organs leads to a chronic disease.

Prevention is better than cure so to avoid such complications people should take 40 sessions of one hour each daily for 40 days or another option could be taking sessions in a 12 hour interval and completing it in 20 days.

The effect of the above mentioned therapy lasts for approximately 5 years

A basic math would lead to the conclusion that if a person gives 40 hours of his or her life, he/she could sustain a tentatively good health for about forty thousand years.

**The EECP treatment is given under the guidance of  
Dr Pranav Kabra**

[raksha24hrs@gmail.com](mailto:raksha24hrs@gmail.com)

**02242641181**

**Raksha Multispecialty hospital**

**D 11, First Floor**

**Asmita Jyoti CHSL, Marve Charkop Naka**

**Malad West**

**Mumbai city**



# *Final year Class of B.Pharm 2020*



Abhijeet  
Teli



Aditi  
Venkatesh



Akash  
Vishwakarma



Akshay  
Yadav



Ashish  
Dubey



Ashish  
Jhangiani



Atharva  
Bhatkande



Atreya  
Karandikar



Azhar  
Khan



Barkha  
Makhija



Batul  
Bhopalwala



Bharti  
Ahuja



Chetan  
Mhaprolkar



Deepak  
Mahind



Dhawal  
Sonar



Ira  
Toraskar

# *Final year Class of B.Pharm 2020*



Jui  
Pendse



Karan  
Desai



Kartik  
Sonawane



Kavneel  
Sayal



Kinjal  
Gawde



Kirti  
Sawant



Kishan  
Choudhary



Krushi  
Popli



Manali  
kadam



Megha  
Jeelon



Mihir  
Ghonge



Mohit  
Davaria



Mukesh  
Choudhary



Muskan  
Tardeja



Namrata  
Relwani



Natasha  
Coutinho



# *Final year Class of B.Pharm 2020*



Neha  
Dembrani



Neha  
Powar



Nikeeta  
Palande



Pooja  
Rathod



Poorvi  
Joshi



Prajwal  
Raut



Pranesh  
Chandak



Reema  
Gupta



Ritu  
Chandwani



Rohan  
Domadia



Salonee  
Tawde



Sangita  
Wakade



Sayli  
Kharkhar



Shreya  
Ajithkumar



Shubham  
Lachure



Sneha  
Suthar



Suyog  
Tangade



Tanvi  
Kamble



Vanashree  
Chaudhari



**DESIGNED BY PUNEET DIDWANIA**

**FOR INQUIRIES, CONTACT 7718870545 / PUNEET.DIDWANIA09@GMAIL.COM**



