Biosimilars Bootcamp and Round-Table – 2016 (Distribution Version 4)
A joint program offered by
The Association of Biotechnology Led Enterprises (ABLE)
and
The Biotechnology Innovation Organization (BIO)
Thursday & Friday, December 1 – 2, 2016
India Habitat Center
New Delhi, India

Introduction: The Promises, Prospects and Challenges of Biosimilars

India today is arguably the Pharmacy of the World by virtue of its production and marketing of small molecule generic pharmaceuticals. This first phase of the Indian generics medicines and vaccine industries began its march to excellence in 1984, when the US passed what is known as the Hatch-Waxman Act. With this legislation, the US streamlined the generic approvals, thereby making it easier for Indian generic companies to compete in the US pharmaceuticals market.

More recently, the latest advances in biomedicine have been made in biologicals, treatments created through advances in biotechnology. According to published reports, six of the current top ten biopharmaceuticals are biologicals, with 2015 global sales in excess of US$56 billion. However, such molecules, as a result of their complex structure, are much more difficult to make, requiring much more stringent and sterile manufacturing conditions. Biologicals are practically impossible to replicate exactly. However, biosimilars are currently being developed which closely approximate the original reference product and are seen as more cost-effective options when available. Pharmaceutical industry observers consider that today's opportunity for India in biosimilars is the result of the rise of the generics industry since 1984.

Major countries around the world now seek to make biosimilars available to their citizens. Entry into the biosimilars market will be competitive on a global scale, but the scientific, clinical and manufacturing complexities will likely see biosimilar production cluster in only a few geographies in the foreseeable future. With necessary investment in infrastructure and regulations, the Indian pharmaceutical industry is beginning to position itself to exploit the opportunity much as it did in the case of generic small molecules. India certainly has some of the competitive advantages, although the specific advantages are just now emerging. India's global leadership will depend on how well the individual companies leverage current capabilities and how seamlessly they can extend these capabilities into this new class of medicines. As a means of supporting this opportunity – for industry and people needing access to these innovative products – India's Association of Biotechnology Led Enterprises (ABLE) and the US-based Biotechnology Innovation Organization (BIO) have assembled a rigorous two-day open-enrollment "Boot Camp" to help accelerate the scientific,

clinical, medico-legal and commercial knowledge base of industry. At the same time through an invitation-only Government-Industry Round-Table, ABLE and BIO are seeking to promote and facilitate the right policies that will assure broad participation in the production and global distribution of cutting-edge medicines that can transform human health care.

Biosimilars: The Scientific and Clinical Essentials

A biosimilar is a molecule that is close in structure and function to an existing biologically-based medicine that has been manufactured and distributed as a proprietary product. As the patent protection for these proprietary medicines runs out, the opportunity arises for sophisticated biopharmaceutical producers to enter the market and provide "similar" compounds. Traditional small molecule synthetic chemical medicines are relatively straightforward to characterize and manufacture. This is not the case with the large molecule biologically-based medicines. The precise nature and function of biologicals are difficult to characterize fully on the one hand, and the method of biological processing and production is not fully reproducible on the other. Thus, it is challenging to establish that two products have exactly the same safety and efficacy profile. Development and production of biosimilar medicines, therefore, are subject to a different and higher standard than small molecule medicines.

The nature of biologic medicines is to target specific proteins, making them more effective treatments than small molecule therapies for a variety of medical illnesses and conditions. Biologic therapies such as erythropoietin (for red blood cell production), insulin, cellular growth factors (for protection of cells during chemotherapy), and growth hormones have played a valuable role in treating serious illnesses. The new wave of complex biologics like monoclonal antibodies (mAb), cytokines and therapeutic vaccines, are now transforming the standard of treatment for cancer, autoimmune disorders and other chronic diseases. By 2020 new biologic treatment alternatives will be available for severe asthma, chronic eczema, atopic dermatitis, and familial hypercholesterolemia across developed markets1. Cancer immunotherapies, which harness the power of the immune system to target and fight malignant tumors, are expected to revolutionize cancer treatment by sparing patients toxic effects of chemotherapy. These medicines will enjoy a period of proprietary life, but will also become prospects for biosimilar production over time.

Over the last decade, there has been a global dialog as to the requirements for establishing safe and effective biosimilars. The world is closing in on a consensus for these standards. In parallel to that process of standards harmonization, pharmaceutical companies in India and throughout the rest of the world have converged on the perfection and production of over 60 biosimilars world-wide (See Table 1for a partial list). Of critical importance is that the world is converging on harmonized regulations and standards for biosimilars. India is participating in the dialog and ultimately will have to align its own regulations with international standards in order to sell beyond India's borders and be competitive.

Table 1: Selected 'Similar biologics' approved and marketed in India (from the Generics and Biosimilars Initiative)

Product name*	Active substance	Therapeutic area**	Approval/ launch date in India#	Company
AbcixiRel	abciximab	Angina, Cardiac ischemia	23 Apr 2013	Reliance Life Sciences
Actorise	darbepoetin alfa	Anaemia, Cancer, Chronic kidney failure	6 Jan 2014 [4]	Cipla/Hetero
Basalog	insulin glargine	Diabetes	2009	Biocon
Bevacirel	bevacizumab	Colorectal cancer	10 Jun 2016 [5]	Reliance Life Sciences (Lupin)
CanMab	trastuzumab	Breast cancer	23 Oct 2013	Biocon
Ceriton	epoetin alfa	Anaemia, Cancer, Chronic kidney failure	NR	Ranbaxy
Choriorel	chorionic gonadotrophin hormone r-hCG	Female infertility	22 Jun 2011	Reliance Life Sciences
Cresp	darbepoetin alfa	Anaemia, Cancer, Chronic kidney failure	23 Mar 2010	Dr. Reddy's Laboratories
Erypro	epoetin alfa	Anaemia, Cancer, Chronic kidney failure	NR	Biocon
Etacept	etanercept	Ankylosing spondylitis, Rheumatoid arthritis, Psoriatic arthritis, Psoriasis, Juvenile rheumatoid arthritis	Apr 2013 [6]	Cipla
Exemptia	adalimumab	Rheumatoid arthritis	25 Sep 2014	Zydus Cadila
Filgrastim	filgrastim	Neutropenia	5 Mar 2013	Lupin
FostiRel	follitropin beta (follicle stimulating hormone)	Female infertility	30 Apr 2010	Reliance Life Sciences
Glaritus	insulin glargine	Diabetes mellitus	Mar 2009	Wockhardt

Insugen	human insulin	Diabetes mellitus	NR	Biocon
Intacept	etanercept	Ankylosing spondylitis, Juvenile idiopathic arthritis Psoriasis, Psoriatic arthritis, Rheumatoid arthritis	Mar 2015 [11]	Intas Pharmaceuticals
MabTas	rituximab	Lymphoma, Non-Hodgkin's Lymphoma	26 Feb 2013	Intas Pharmaceuticals
Myokinase	streptokinase	Acute myocardial infarction, Deep venous thrombosis, Acute pulmonary embolism	NR	Biocon
Peg-interferon alfa 2b	Pegylated recombinant human interferon alfa 2b	Chronic hepatitis B, Chronic hepatitis C	25 Apr 2013	Intas Pharmaceuticals
Platelet derived growth factor	rh-PDGF-BB + β-TCP	Peridontal defect, Gingival recession	28 Apr 2010	Virchow Biotech
Rasburicase	rasburicase	Malignancy associated hyperuricemia	28 Aug 2012	Virchow Biotech
Razumab	ranibizumab	Wet macular degeneration, Macular edema, Degenerative myopia, Diabetes complications	19 Jun 2015	Intas Pharmaceuticals
Relibeta	interferon beta-1a	Multiple sclerosis	2 May 2011	Reliance Life Sciences
Repoitin	erythropoietin	Anaemia, Chronic kidney failure	29 Nov 2011	Serum Institute of India
Rituximab	rituximab	Non-Hodgkin's Lymphoma, Rheumatoid arthritis	12 Feb 2015	Reliance Life Sciences
Rituximab	rituximab	Non-Hodgkin's Lymphoma	27 Feb 2013	Zenotech Laboratories
Terifrac	teriparatide (parathyroid hormone)	Post menopausal women with osteoporosis who are at high risk for fracture	1 Nov 2010	Intas Pharmaceuticals
Teriparatide	teriparatide (parathyroid hormone)	Post menopausal women with osteoporosis who are at high risk for fracture	21 Aug 2012	Cadila Healthcare

Teriparatide	teriparatide (parathyroid Hormone)	Post menopausal women with osteoporosis who are at high risk for fracture	13 Aug 2012	USV
Zavinex	interferon alfa-2b	Chronic hepatitis B, Chronic hepatitis C	21 Jun 2011	Cadila Healthcare
Zyrop	erythropoietin	Chronic kidney failure	28 Apr 2010	Cadila Healthcare

Many of the medicines listed above were developed as the Indian standards were in a state of evolution. The initial set of guidelines established by India's drug regulator, the Central Drugs Standard Control Organization (CDSCO), were released in 2012. In 2016, after extensive consultation with industry, CDSCO released new guidance for biosimilar developers to reflect new scientific understandings and global practices. Going forward, biosimilar products will be subject to these new guidelines. India's biosimilars market currently includes eight biosimilars approved under the new Guidelines, including one for AbbVie's Humira (adalimumab) and two biosimilars for Roche's breast cancer treatment Herceptin (trastuzumab), which are not approved in any other countries (though Korea's Ministry of Food and Drug Safety has approved a different Herceptin biosimilar).

The Biosimilars Boot Camp: Learning Objectives and Who Should Attend

By the conclusion of the Boot Camp, the attendees will understand:

1. The distinction between a biosimilar and a new biologic
2. The unique mechanisms of actions of biosimilars
3. The essentials of manufacturing systems and strategies
4. Applications of quality management principles to biosimilars
5. The fundamentals of IP law as related to biosimilars
6. Elements of the legal environment surrounding biosimilars
7. Basic commercialization issues such as stability and formulation, and upsteam and downstream optimization
8. Considerations surrounding marketing, such as product development strategies, life cycle management, product interchangeability, naming and branding challenges and the role of partnering and strategic alliances
9. Fundamental policy differences of Europe, South Korea and the United States
10. Framework of Indian regulations affecting biosimilars

Who should attend?

Government regulators
Product development staff
Compound selection staff
Manufacturing executives and planners
Market assessment staff
Strategic marketers
Legal and IP staff members
Medical and clinical affairs staff
Regulatory managers
Business development managers

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Thursday & Friday, December 1 – 2, 2016
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<table>
<tr><th>Session</th><th>December 1
Plenary Track
(All Attendees)</th><th>December 2
Education Track
(Self-Selected)</th><th>December 2 –
Round-Table Track
(By Invitation Only)</th></tr>
<tr><td>8:00 to 9:00 AM</td><td>Registration and Continental Breakfast</td><td>Registration and Continental Breakfast</td><td>8:00 to 8:30
Registration and Continental Breakfast</td></tr>
<tr><td></td><td></td><td></td><td>Session 11
8:30 AM to 9:00AM
Organizational session
-- Establishing goals/objectives of R-T
Lila Feisee, BIO, PM Murali, ABLE
-- Agenda Review
-- Formation of working sub-groups</td></tr>
<tr><td>9:00 to 10:30 AM</td><td>Session 1
9:00 to 9:15
Welcome and program structure
Kiran Mazumdar-Shaw
Stephen M. Sammut

9:15 to 10:00 AM
Keynote address:

10:00 to 10:30 AM
-Overview Biosimilars
-The challenges of a biosimilar vs. a new biologic</td><td colspan="2">Session 12

Plenary Session

9:00 to 9:45 AM
Address by YK Gupta, All India Institute of Medical Science (AIIMS)

9:45 to 10:30 AM
Moderated discussion:

Central Drugs Standards Control Organization
Drug Controller General of India
Industry Representative</td></tr>
<tr><td>10:30 to 11:00 AM</td><td colspan="3">Break</td></tr>
</table>

11:00 AM to 12:30 PM	**Session 2** **Developmental Issues Panel** -Product Development Strategies -Interchangeability issues -Full description to follow	**Session 6** **Marketing Panel** -Naming and Branding -Life cycle management -Partnering and strategic alliances	**Session 7** **Subject Expert Committee (SEC) "Mock" Project Review Session** Members of SECs are invited to a special mock review session of a product application	**Session 13** **Moderated Panel Discussion** Department of Biotechnology Indian Council of Medical Research (ICMR) Department of Pharmaceuticals
12:30 to 2:00 PM Luncheon	**Session 3** Speaker on IP Aspects of Biosimilars	**Session 8** Plenary Luncheon Speaker TBD		
2:00 to 3:30 PM	**Session 4** Legal Issues Discussion of legal issues affecting biosimilars with a focus on several existing approved biosimilar products and their legal hurdles as examples.	**Session 9** **Regulatory overview presentations:** 2:00 to 2:45 PM Europe: background; clinical data; product guidance; safety; EMA approved products 2:45 to 3:30 PM -South Korea: background; clinical data; product guidance; safety; approved products		**Session 14** **Working Groups** 2:45 to 3:15 PM Charges to working groups 3:15 PM through break and until 4:30 PM Working Groups Break Out
3:30 to 4:00 PM	Break			
4:00 to 5:30 PM	**Session 5** **Commercialization Panel:** -Stability and formulation	**Session 10** **Regulatory overview presentations (continued):** **4:00 PM to 4:45 PM**		4:00 to 4:30 PM **Working Groups Continue**

	-Optimization: -- Upstream --Downstream	US Overview background; clinical data; product guidance; safety **4:45 PM to 5:30 PM** India Overview background; clinical data; product guidance; safety	**Session 15** 4:30 to 5:30 **Working Groups Report**
5:30 to 6:00 PM	**Summation and adjournment** Kiran Mazumdar Shaw	**Summation and adjournment** Stephen M. Sammut	**Summation and adjournment** Lila Feisee and PM Murali
6:30 to 9:00 PM	**Dec 1 only - Dinner for Round - Table Track Registrants – by Invitation** **Venue : The Deck, India Habitat Center**		

Tuition and Fees

BOOTCAMP Registration Fees ALL participants: Dec 1 and 2: INR 10,000/- (Inclusive of Taxes)

Limited seats: Organizers reserve rights to exercise selection of attendees for participation in BOOTCAMP
Venue: Dec 1 : Casuarina Dec 2; The Theater (Indian Habitat Center) Lodi Road, New Delhi

Payments to be made favoring "Association of Biotechnology Led Enterprises"
Address: ABLE No 123/C 16th Main Road 4th Block 5th Cross Koramangala
Bangalore 560 034, India

Contact: Anil Chauhan anil@ableindia.org.in 9871632688

Payment Modes

1) NEFT/RTGS Transfer

Bank Details :	
Description	**Information**
Vendor Name	**Association of Biotechnology Led Enterprises**
Address of Communications	#123/C 16th Main Road, 4th Block, 5th cross, Koramangala Bangalore - 560034
Phone No	080-41636853
Bank Name	**Yes Bank Ltd**
Bank Branch Name	**Kasturba Road Branch**
Bank account Number :	**002294600000104**
IFSC Code	**YESB0000022**
MICR Code	**560532002**
SWIFT Code	**YESBINBB**
Bank Address line 1	Ground floor, Prestige Obelisk
Bank Address line 2	Municipal No 3,
Bank Address line 3	Kasturba Road, Bangalore - 560001
State	Karnataka

2) Cheque/DD payable at Bangalore, made in favour of "Association of Biotechnology Led Enterprises"

Cheque/DD must be sent to the following address:

Association of Biotechnology Led Enterprises
ABLE Secretariat
No 123/C, 16th Main Road, 5th Cross, 4th Block, Koramangala, Bangalore – 560034, Karnataka, India
Tel/Fax: +91 80 25633853/4163 6853

Attendee Details & Payment Details (Must be emailed to Dr. Anil Chauhan at anil@ableindia.org.in)

Name:

Designation:

Organization:

Mobile / Telephone:

E-mail:

Address:

Payment mode: Online Transfer (NEFT/RTGS) ☐ Cheque / DD ☐

Transaction Reference Number: Cheque/DD Number: