

TDU Bengaluru MSc Life Sciences Ayurveda Biology Review

Host: Virender Singh, Founder of SciKonnnect and BioPatrika

Guests: Prof. Ashwini Godbole and Prof. Subrahmanya Kumar from TDU Bengaluru

Virender Singh: Hello, everyone. Welcome to Campus Konnnect by BioPatrika. Today, we'll be talking about TDU University, which is situated in Bengaluru. And we have two of the faculty members from MSc Life Science Ayurveda Biology program. So let's welcome Professor Ashwini Godbole and Prof Subrahmanya Kumar.

Introductions and Background

Prof. Ashwini Godbole: Namaste, everybody. We are happy to be part of this interview by Biopatrika. And we will be telling you a little more about what we mean by Ayurveda biology. Why do we have MSc Life Sciences, with specialization in Ayurveda biology? But before going to that, let me introduce myself. I'm Ashwini Godbole. I'm a biologist by education, by training. I did my BSc and MSc in Orthodontic Plant Biotechnology. And then moved on to a more deeper research by doing PhD in NCBS TIFR, that is National Center for Biological Sciences, Tata Institute of Fundamental Research. So I did my PhD there in cell biology and biophysics. I looked at something called membrane proteins, membrane channel proteins. And it was a very deep dive into doing fundamental research in biology. And I enjoyed that. During my PhD, I looked at one molecule, the channel protein, interacting with other molecules in the biological system like cells. Then I soon realized that my calling is a little broader and looking at what is healthcare and how this fundamental research gets translated into something which is immediately useful for human beings and in general, the biology to something useful biology, immediate effect, which we want to see in society. And that's why I figured out what is available there. And basically, I like Indian things. And I have a very personal, very good experience with Ayurveda. So automatically, I was attracted towards Ayurveda. And I started looking at Ayurveda as a biologist. And I saw that there is a lot of merit in looking at Ayurveda as a biologist that we can study it in more depth. And then we can bring out with Ayurvedic clinician, Ayurvedic clinician like my friend here, an Ayurvedic expert, we can bring out something which is contemporary relevant, relevant for contemporary healthcare needs. And just not healthcare, for health needs to improve our health. And I could see a lot of opportunities there. And that's what brought me to TDU. I'm associate professor here, I, the group as for research, as a research group looks at the cognitive enhancers of Ayurveda, also the nerve tonics of Ayurveda, which can be used for the mainly for degenerative diseases like Alzheimer's, Parkinson's, and basically to keep you healthy all throughout your life, as far as the nervous system. So that's my current research. And I do teach cell biology, animal health, and animal physiology. Now, in the course, MSc Life Sciences Ayurveda Biology, I also try to take the students through a journey of starting from molecular, from preclinical experimental setup, all the way to clinical, because our group is also involved in community-based clinical research. So all put together, it's a, I think it's the whole field together, which is very attractive. And because it's so transdisciplinary, it is even more attractive and relevant. So with that, I will pass on the baton to Prof Subrahmanya Kumar.

Prof. Subrahmanya Kumar: Hello, I'm Prof Subrahmanya Kumar, basically an Ayurveda Vaidya. Pharmacognosy and pharmacology of medicinal plants is my area, core area of interest and core area of study. I got my PhD for my studies on the concept of substitution in medicinal plants, finding out substitutes for rare and endangered medicinal plants was the PhD subject, what I did during my PhD studies. Later, I started my career here in TDU as a scientist and as faculty. Apart from medicinal plants, I started to study or I started my research on the area of rejuvenative medicine in Ayurveda, that is called as Rasayana Tantra. There too, with a special focus on Panduroga or iron deficiency anemia. How to manage iron deficiency anemia without medicine? That means by providing appropriate food. This was the area of research for the past five, six years.

Teaching Roles and TDU's Mission

Prof. Subrahmanya Kumar: Coming to teaching in the program MSc Ayurveda Biology or MSc Life Sciences Ayurveda Biology, I teach fundamental principles of Ayurveda, then systemic and molecular pharmacology and the concepts of drug design in Ayurveda. Also, I contribute in terms of integrative immunology. Thanks a lot.

Virender Singh: I think you both touched upon briefly what you teach and what's your background. So before we move on to the program specifically, can you briefly tell what TDU is and what's its core mission, which is driving this intercalation of life science and Ayurveda?

Prof. Ashwini Godbole: So I would like to tell you a little bit about the genesis of TDU because, you know, history can put things in perspective, right perspective. So the founder, Ayurveda founder Darshan Shankar, always believed that there is a lot to offer in the traditional knowledge about health care in India to the current needs of health care.

TDU's History and Focus

Prof. Ashwini Godbole: So that's where the whole thing began. We realized that there are 6,000 medicinal plants in India and we haven't even documented it. So early on in 1993, we began the documentation of medicinal plants. What exists? Where does it exist? What is it used for? And only 1,500 plants are documented in 45 systems like Ayurveda and another 500 in Siddha, Urani, Swaripa. So those are the other resources. So we realized that that's what, that treasure we have. We have so much information also, not just the material, but the information related to it. And we started documenting that. That was the first activity. Then we also saw that if 6,000 medicinal plants are there and 1,500 or 2,000 are in the 45 system, the remaining 4,000 knowledge of 4,000 plants is local, the people, and it's not put into any textbook. So we started looking at the local health traditions, documenting people's knowledge. People can come from any walk, but then they may not be in professional health care, health care workers, but we can see that they have a lot of knowledge about what is used for what. So and that we also see in our families, grandmothers, grandfathers, earlier generations have that and they pass on to the next generation. So that's how things happen on the ground in India. And we looked at that, then we started looking at that. Then with that, we started conservation efforts, conservation of medicinal plants because of so many things we can, I don't need to list it out here, but like

deforestation, over-harvesting, we are losing plants in the wild. So we started working a lot in conservation and that still becomes local health tradition documentation and conservation are still our major work areas of TDO. We started doing in-situ conservation, meaning preserving, conserving the plant where it belongs, because there are a lot of connections with soil, the other plants, the environment, which makes the plant very special and it should be conserved where it belongs. So that in-situ conservation is the USP of our institute. And then we became a university when we became, before that, all the activities which we currently have are always there. We have a lab where we look at the Ayurveda biology of it mainly.

Research Focus and Facilities

Prof. Ashwini Godbole: While we are saying Ayurveda biology, underlying that is chemistry and physics as well. So we are not just saying biology, biology, vaccines. And as I told you, I have also done my PhD in biophysics. So of course, biology is always there, underlying that is chemistry and physics also. So we do Ayurveda biology-based research in various fields. And we have a 100-bed hospital connected to our university, our hospital, and we call it a healthcare center.

Health-Centric Approach

Prof. Ashwini Godbole: So it's not very disease-centric, it's a more health-centric place. And we have that, and we have veterinary care, we have research in veterinary care. And so those are basically mainly, and we have a lot of emphasis on food, food and food, because we eat food every day.

Food and Transdisciplinary Learning

Prof. Ashwini Godbole: I think Subramanya can tell you more about that, how Ayurveda, what Ayurveda. So with all that background, I think that this, as in a capsule, we can offer to the new generation, upcoming generation, both from the science, the pure science, the life science or the medicine background, or from the Ayurveda traditional medicine background. So modern medicine, biomedicine, as well as traditional medicine. So that's why we have this unique course, where the takers are from both the sides. There has to be a, there should not be any boundaries. Even while different students sit in the class, they learn from each other. So that's our approach.

Prof. Subrahmanya Kumar: Ayurveda considers pathya or the correct food suggestion is about 50% of the treatment. There is a beautiful saying, if the patient is not consuming pathya or an appropriate diet, what is the use of medicine or treatment? Similarly, if the patient is consuming proper pathya, then what is the necessity of that particular treatment to manage that disease? So that means the importance of food in the management of diseases. Right from the classical literature, Charaka Samhita, speaks a lot about food, what is right food, what is inappropriate food. And it is not just food ingredients, but how a particular recipe should be cooked, and how it should be consumed, and in which season, and in which place it has to be consumed, etc. A lot of information is given. Somehow the idea of food is neglected to certain extent by the

mainstream science or mainstream medical sciences. We wanted to rejuvenate Ayurveda's or the Indian traditional knowledge about food. So we initially created a database of Ayurveda food ingredients as well as Ayurvedic recipes, right from Charaka Samhita, etc.

Food Documentation and Holistic Health

Prof. Subrahmanya Kumar: To the 16th century books on dietetics, they are called Kshema Kuttu Phalam and Bhojana Kuttu Phalam. We have not only documented the food recipes, but tried to prepare, contemporarily how to prepare those recipes. And we tried to demonstrate using a modern day kitchen facility, which we call the scientific kitchen, and tried to record that and make it publicly available. That's the breadth of the things which we deal with, with a common line of mainly the health sciences. So all of this is driven for health. And we would like to think that we are not only centered on human health, but planet health, animal health. So it's one healthy kind of approach, which is very unique to this. So Raphael, just now while we were telling you the story about our university, you would have realized that we are looking at multiple facets. But the common thread in all this is most of the time is Ayurveda, because Ayurveda looks at human health, for sure Ayurveda for animal health, for sure Ayurveda for plants. So we have Ayurveda as an overarching theme under which even yoga comes under that, and biology. So and having said that, we are not only the Ayurveda biology thing, but we are also, we are, we are not knowledge coming from any which way, we are open. Thanks.

Virender Singh: I think it's very informative to know about the history of TDU and how it is managing different programs, all interconnected with a central theme with Ayurveda. So, moving on to the program specifically, can you elaborate what's the core structure for students and what's the eligibility criteria for students who could enroll in this program?

Prof. Subrahmanya Kumar: Yeah, this basically MSc Life Sciences program. So it has all necessary elements required for a student to be qualified as MSc Life Sciences. Additionally, we have the essentials of Ayurvedic concepts, right from the fundamental principles of Ayurveda up to the Materia Medica of Ayurveda that is called as Javiya Guna Shastra and something called Vaishya Jaya Kalpana, wherein the concepts of pharmaceuticals is taught and also the concepts of food, which is Ahara, Pachya, etc, which we have already discussed is also taught. From the modern biology side or modern life sciences side, what we have in the course, the papers are mainly, which will make the person equipped with all the current technologies at this, that will be not equipped to the technologies, I would say that will be, they will be aware of what is happening in that field at this point, is that's why we have starting from molecular biology, cell biology, then we have phytochemistry, such kind of subjects where we have physiology, plant physiology as well as animal cell physiology and then we have immunology. So, all these modern, so to say modern science subjects are also taught along with the Ayurveda relevant portions of, portions from Ayurveda.

Internship and Eligibility

Prof. Subrahmanya Kumar: Apart from this, the course, the uniqueness of the course is about 8 or 9 months of internship wherein the student will select a particular subject or topic of his or

her interest and will identify an able guide and get trained under that guide and will take up this particular research topic with very serious studies. This is probably the uniqueness of this particular course. So, and the internship which Subramanian talked about, makes them, equips them to how to merge these two disciplines in real life. Another thing which helps, internship helps is for independent thinking, designing a research mission, carrying out the, designing an experiment, just designing an experiment is an experience. So, they get exposed to all these things and that is actually, I think, a very different experience. The student passes out from MSE, a life sciences, Ayurveda biology from TDU, I am sure that will be a totally different experience for the student. And the second question you asked about eligibility, any combination of BSE is okay to come here and the programs of BALS, that is Ayurveda, MBBS or modern medicine, including dentistry or veterinary science, pharmacy sciences. So, I think, as you can see, the intake, the entry criteria is very, very broad. Because this is a transdisciplinary course, what we want, expect students to get with their passing out from this course, what we want students to inculcate is the way how to think transdisciplinary.

Transdisciplinary Thinking and Diverse Backgrounds

Prof. Ashwini Godbole: So, that is what is very important. That is why we need to bring in more than a variety of people coming into this course, better it will be, because there will be communication between the students coming from different fields, the bachelors from different fields, be it engineering, be it medicine, be it whichever way, by pure science or be it things like dentistry and so on. There will be a lot of the students who will talk to each other, they will learn, basically they will learn to appreciate the other side. Because I feel that there is a necessity, you zoom in for a certain time, because you want to study something in depth. But at the same time, you should zoom out and see what other things which merge with this field of course, and how you can make it or how you can utilize this in the current scenario, the current life, because life is not always something you need to own, there are multiple things happening in life. So, that is why I think this gives a lot of advantage, even having people from multiple backgrounds is a big, big difference from other courses to this course, because there is a chances that people will meet people from other schools and for the faculty also, we are also getting to meet students from different backgrounds and that is a big advantage.

Infrastructure and Hands-On Experience

Virender Singh: Yeah, thanks for highlighting, I think, different eligibility criteria, not restricting to only people with a background in Ayurveda. So this definitely brings uniqueness to the program and in combination with the opportunity to work or like get an internship at different places as well as at TDU. So as part of MSc, I think one important aspect is also to get hands-on experience on research or different techniques. So what is the infrastructure available to the students who would like to join this program and how is the infrastructure bringing modern science as well as Ayurvedic science together?

Prof. Ashwini Godbole: So yeah, that's a very good question you asked because I definitely, we both would like to highlight that is another unique point about TDU. We have a TDU campus in Yelahanka, Bangalore and we have 1500 medicinal plant species on our campus. So our

medicinal plant portion, the class, actually happens in the gardens and not the class. So that's a very big advantage. Apart from that, we have a very good lab facility. I wouldn't say that it is too high-tech but it is a very, very much sufficient lab facility. We have a separate lab for our MSc programs where we have where people like the students enrolled for the MSc program can use those small and big equipment, get a feel of it, get the confidence to use it by themselves. And just to list out what we have, we have the molecular biology equipment like PCR and we also have qPCR, quantitative PCR, RT-PCR machines. We have the gel documentation system, all the electrophoresis, the electrophoresis equipment. We have different types of incubators, microbiology facilities. I am a *C. elegans* scientist, so the *C. elegans* facility we have. We have a drosophila facility where we use the drosophila plant. So we have the model organic facility. Vishnu, our colleague, also has a cell biology facility and we have that. So we have an animal cell culture facility. We have a repository which has a lot of herbarium sheets and raw drug repository. So for identification plans or quality control, all those things we have. We have a good chemistry analytical lab where we have HPLC, we have GC-MS and all other chemico-physical characterization equipment which are small and big equipment. Of course basic equipment like pH meters and all those things, everything is available. It's a self-sufficient lab, laboratory as such and situated in a perfectly perfect campus which has a lot of medicinal plants and herbarium supported by herbarium database. So I should tell you that we have a very good database and where we get a lot of data about the scientific publications related to a plant as well as how it is used in traditional medicine.

Medicinal Plant Collection and Holistic Experience

Prof. Subrahmanya Kumar: In addition to Ashwini, yes, we have a good collection of medicinal plants. The species are collected from different parts of India and interesting to say that some of them are endemic to certain geographical locations. The field botanists and taxonomists identified these species, they brought here and we cultivated, we grow here as demonstration gardens. Apart from that, this campus is a living example of how these species of medicinal plants are used. You have the medicinal plants growing on this campus. The students fetch that, collect that and they use it for their studies or students are demonstrated how to convert raw medicinal plant into a pharmaceutical product. We have a small pharmaceutical facility here which feeds to the hospital, a 100-bed integrative medicine hospital. Students get to know how medicines are prepared here in the pharmaceutical facility and how it is dispensed and they see how this particular medicine gives benefit to patients. So I would say that this ecosystem gives students end to end experience. Ashwini explained about various facilities available here. But the uniqueness of this place is that experts speak to each other. Lot of dialogue happens, a lot of knowledge exchange happens. I think this is one of the unique and very important parts of the transdisciplinary sciences. Knowledge exchange has to happen, healthy dialogues have to happen. Then only something solid, concrete ideas can come out that can help to solve the problems faced by the society.

Student Freedom and Career Development

Virender Singh: Yeah, I think you both highlighted important points and came from a student perspective. So you mentioned that you have almost all the facilities which might be required by

master students. But how much freedom is provided to students to explore these facilities and to get hands-on on each and every instrument?

Prof. Subrahmanya Kumar: Yeah, as part of the syllabus, whatever they are supposed to study, which is taught in the practical classes, one thing. Apart from that, we explained to you about the research program or the mini research program of their part of the dissertation. There, they are allowed to use, not use, explore, use and learn or revert. As part of their thesis, students are allowed to use the instrument initially, maybe under the supervision of seniors or the guides. Later, they are allowed to use it on their own. So, also at this point of time, we don't have a great number of students here. I mean, a large number of students are not there. So, we believe that students are given proper exposure in terms of understanding the facility. However, getting expertise in a particular facility is maybe taking time and which cannot be given within the span of one and a half, two years of time. So, having said that, yeah, we do train them in the basic lab equipment and the specialized laboratory skills. If a person is doing an internship and it is required for that research topic, those things will definitely be exposed to and will be given hands-on kind of experience. But definitely because of this, what he highlighted, because of that eight months internship program which is there, they really get to see the real lab and what happens in the real lab and not only in the practice. And one more thing I would like to highlight is that during the course, we also go out, take students out to different research institutes, different types of places, and even industry. And that actually makes a big difference. So, not only they are aware about what's happening outside, outside the four walls of the classroom. I think that's an important point and I myself worked in industry and academia, it's important to at least have a glimpse of what happens in industry beyond academic setup.

Prof. Ashwini Godbole: Apart from the industry visits and the visits to the scientific institutes, we also take them to the conservation sites. So, we have something called a medicinal plant conservation area. So, hectares of forest will be kept, and will be designated as a conservation site for particular plants or any plant for that matter which needs conservation, there is a conservation need for that. And we do take them to those sites and see that it's not only the plant that is of course important, but apart from that, locals who are dependent on that forest, the forest department, all those are the players of that ecosystem and the stakeholders of the ecosystem. And we do visit even the sites, conservation sites and give that field to... So, starting from the high-end laboratory in the institutes to the forest sites where the actual fieldwork of the conservation happens, we cover all of that in our visits. So, that's, and the industry of course.

Career Development and Alumni Success

Virender Singh: Thanks for highlighting, I think, this holistic approach of going towards academia as well as conservation prospects, which could be associated with this program. So, from a student perspective, when we do masters, one important thing is career development and again, which is leading to placements from this program. Can you highlight what career development aspect is associated with this program?

Prof. Subrahmanya Kumar: T2U has a long history of working with NGOs, industry and academic institutes. So, from the first week of the student life in T2U, the teachers or the faculty

tries to understand the interest and ability of the student to work in specific areas. And we try to understand what is their interest, what they would like to achieve as their career. So, a lot of interactions, one-to-one interaction with the faculty and the student happens and faculty tries to connect with different appropriate places. For example, a particular student may be interested in getting a PhD in a specific area and probably he or she may have a particular aim to reach a particular university. So, the faculty tries to connect with those institutes and we try to give required training. Many times, this is not very, very formal training, but very informally this will be happening. We try to speak with the industry partners, valuations from industry and other NGOs, etc. Wherever there is opportunity, we try to connect the students and the prospective employees. And we understand that these students from BAMS or from MBBS, many times they define their career objective or aim that they would like to be sound with the knowledge or academically they need to be sound with, but they would like to continue their practice, clinical practice.

Prof. Ashwini Godbole: So, I would like to add a couple of things. This question which you asked, which is a very, very relevant, very important question at that stage of life, right? When people are getting to master's, because master's is making you specialize in a certain field and after that, you are supposed to execute that knowledge. So, I'm very happy to say that we have been very conscious about this from the beginning. Even our board of academics involves people from experts from different areas. So, we have run our syllabus and the way our program will go through these experts. So, the experts come from the research institutes, of course, with professors with longstanding, very good careers in science. But at the same time, there are doctors who are very good clinicians with good practice and good experience with the world around as far as the medical, both medical doctors and the Ayurveda. And then we also have industry experts on the board of academics. So, we have taken this syllabus and planned it through these experts. They have suggested the modification, we have modified that. So, having said that, we are in constant dialogue, as I said, with these, all these people will be the employers for our students in future. And that can be a scientist also, because the student who wants to pursue a career in science, like PhD, higher study, is also good, like people know that person is passing out from TVU. And this is what they would have learned and that they could add. So, a little bit more extension from this is that our alumni right now from the MSc program are very well placed. I'm very proud to say that they are very well placed. Because there are people who are in industry, people who have gone for higher studies PhD in India or abroad, say Japan and Israel. And so we are going now again, there are people who and the students have made a very informed judgment or informed decision about where they want to go. There are some students whose calling was public health, and they are in NGOs and public health organizations where they are there. And there are people, Ayurveda doctors who have got a degree in our institute. They are well placed in an industry, Ayurveda pharmaceutical industry, or even other industries. So that's how they have somehow gone to do scientific writing. And so there are people who have whatever three batches we have passed out, we have got people getting into very good fields and whatever they want. And some of them have decided to practice on their own.

Refined Practice and Gratification

Prof. Ashwini Godbole: But their practice they feel is much more refined. And they are able to speak a different language to their patient, their patient relationship. I think all these things are very gratifying for us as a faculty of that course.

Campus Life and Environment

Virender Singh: I think it's good to know that the career development part is taken care of and students are well placed after graduating from this course. So one last question, like students who might be looking for a master's program, and when they have options to explore, just go for either modern science or biotech programs. But if they came across this program, what message would you like to give to them?

Prof. Ashwini Godbole: I have been coming to this campus for more than a decade now. And every day it's a pleasure to come back to this campus. So we are in an area where we are surrounded by forest land. So that's a good thing. We are close to Bangalore, but still we are in a very peaceful and green place. So we have a hostel on campus, which is a very safe, very good hostel. And we can actually give more information if somebody is interested in that. We have recently finished a sports week. So we do have a facility, I won't say a fantastic gym and fantastic sports complex. I'm not claiming that, but we have the environment, which is the reason we have a space facility also for sport. And we do have a canteen, which gives food to the students all throughout the day, all seven days a week. And that's about it. I think we have a good campus life. Though we are a little away from the city, not so now, because the city has grown. But we are in a very peaceful place. And we have a good library, which is open till evening hours. And we allow students to use it whenever they want, whenever they feel like. So yeah, I wouldn't say we have a high-tech campus, but we have a good campus. We have a very pleasant campus. Literally and cultural interests of the students are also encouraged. And we have provision, very informal occasions to express ourselves with their skills and abilities.

Homely Environment

Prof. Subrahmanya Kumar: A kind of homely environment, I would explain, did you, campus life will be not currently, you'll call probably a very homely environment.

Prof. Ashwini Godbole: Yeah, it's not very dry. It's not dry, it's very cozy.

Final Message to Students

Virender Singh: Yeah, great. So before we wrap up, one message for students who might be looking for a master's program, and when they have options to explore, just go for either modern science or biotech programs. But if they came across this program, what message would you like to give to them?

Prof. Ashwini Godbole: I would say that, of course, we have done, I have done normal MSc. I have done MSc in botany, plant biotechnology, and I liked it. I wouldn't say I enjoyed it, but I think you will definitely get that normal MSc thing, and you will get much, much more than that. So I would say that there are a lot of additional benefits, which you will get, not only exposure to

other subjects, the way of thinking will be very different. You will be better placed when you go out of this campus or out of this program, when you pass out from this program. Of course, there will be a lot of very visible and not so visible advantages to joining. First of all, the world has come to the awareness that not a single, it cannot be a silo. None of the disciplines can remain in silo, and this is the first step the students will take to come out of that silo and be more, learn something which is more for, will teach a lot more for life than just for the academic career. And I would definitely encourage students to, if they think, if you want to do something a little different from the routine, definitely join this program, and it will be, they will definitely feel the benefit by, within a couple of months, they will see that there are a lot of benefits. If they want, they can talk to our alumni, we can connect them, they can talk to them, they can get their opinion, because of course the alumni will be just a couple of years apart from the stage where they are, the students, the new students are in this journey. So, we should be, we are ready to want to talk to us. Of course, we are open.

Prof. Subrahmanya Kumar: I would like to call or invite the students who have curiosity to explore the unexplored areas of science. We have a lot of unknown areas in the field of science. And this is the right place to explore those areas.

Virender Singh: Thanks to both of you for sharing valuable insights about TDU and the MSc Ayurveda Biology program. We'll share more information and alumni reviews to help students make informed decisions. Thank you!

Prof. Ashwini Godbole & Prof. Subrahmanya Kumar: Thank you.

Virender Singh: And thank you all for watching. Stay tuned for more interviews on Campus Konnect by BioPatrika.