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Pharmacogenomics: The Impact on Modern Medicine

The world pharmacogenomics often times conjures images of cutting edge medical technology and even a sense of the word comes closer to describing the future of medicine rather than the present in the minds of healthcare professionals. Aside from vague notions, it is not clear that many or even most healthcare professionals have a grasp of what can temporary pharmacogenomics actually entail. So how do we bridge that gap. How might we best bring practicing healthcare professionals up to speed on what 21st century pharmacogenomics might hold for them and their patients. We got some answers to those questions coming up in just a few moments.

You are listening to ReachMD, The Channel for Medical Professionals. Welcome to Focus on Pharmacy. I am your host, Dr. Charles J. Turck, PharmD. Our guest is Dr. Grace M. Kuo, a PharmD and MPH and an Associate Professor of Clinical Pharmacy and Associate Adjunct Professor of Family and Preventive Medicine at the University of California, San Diego. Dr. Kuo is the Director of San Diego Pharmacy Resource and Research Network and she is heading up a program called PharmgenED that is aimed at educating healthcare professionals about the promise that pharmacogenomics holds for improving patient care.

DR. CHARLES J. TURCK:

Dr. Kuo, welcome to the program.

DR. GRACE M. KUO:

Thank you. It is a pleasure to be here and talking with you and your audience.

DR. CHARLES J. TURCK:

Now before we get into work pharmgen-at is, I was hoping we could start a little bit more globally by talking a little bit about what pharmacogenomics entails. Because I think that again the majority of practicing healthcare professionals have at best a vague sense of what pharmacogenomics actually means? So, how is pharmacogenomics applied to healthcare today?

DR. GRACE M. KUO:

Well that is a very challenging question to answer. As you know, many of us who are grasping just even the definition of pharmacogenetics or pharmacogenomics let alone knowing how to practice simply because the evidence is so scarce at this point. So I do believe a strong education program one that can help us catch up with what is rapidly developing is very helpful. Pharmacogenomics is the study of variations in both DNA and RNA characteristics as they are related to drug response. So, it describes in a broad sense, involving the whole genome wide analysis of the genetic determinant for drug efficacy and toxicity and so in comparison pharmacogenetics usually means the study of genetic causes of individual variations in drug response and is a subset of

pharmacogenomics. Nowadays many people use both of these terms interchangeably.

DR. CHARLES J. TURCK:

How has pharmacogenomics changed between the time of its inception and the present day?

DR. GRACE M. KUO:

Well. I think most of us have heard about the human genome project, which began in the 1990s and at that point, the project goals were to understand a genetic makeup of humans to determine the sequence of cryo type base pairs that comprise human DNA and identity. At that time, more than 1.4 million single nucleotide polymorphism or what we called now the snips have been identified, but now more than 3 millions of these snips have believe to be identified and so there is still some ways to ago, but I know that this is a field that is changing very rapidly and it applies to a lot of our practice if not now pretty soon.

DR. CHARLES J. TURCK:

And how might the knowledge of this polymorphisms change the face of drug therapy?

DR. GRACE M. KUO:

Well. Polymorphisms can affect the way we identify disease genes. It also helps us target specific drug therapy for patients and help us to optimize drug therapy instead of having a one size fits all approach for treatment.

DR. CHARLES J. TURCK:

Which is sort of what we do nowadays.

DR. GRACE M. KUO:

Exactly.

DR. CHARLES J. TURCK:

What sort of promise does pharmacogenomics hold for the practice of healthcare in the next say 5 years?

DR. GRACE M. KUO:

Well. Right now, I think probably in the future projection is easier to envision. In the next 5 years though, I think we are trying to catch up

with a lot of evidence to make it available to healthcare professionals. So for example, the FDA has over 1000 drug labels that are reviewed between the years of 1945 to 2005 and over 100 of those drug labels actually contain pharmacogenomics information, 69 of those were referred to the human genome biomarkers, but in practice at least for now only about 12 or 18, may be less than 20 of them have potential novel drug targets, but even of those only less than 5 of them have required pharmacogenomics testing from the FDA.

DR. CHARLES J. TURCK:

So we have mapped the human genome out and we are still sort of in the process of figuring out what to do with that data and comparing it to the information that we have on hand about drugs.

DR. GRACE M. KUO:

That is correct.

DR. CHARLES J. TURCK:

How about further into the future and where eventually do we want to see pharmacogenomics goal?

DR. GRACE M. KUO:

Well I think many of us think as we project to the future and as we now pharmacogenomics help this focus on safety and efficacy of drug management to help provide personalized medicine. In the future, down the road, may be its possible that we could even setup a point of care machine let's say in the pharmacies, in the physician's offices, patients can potentially come, get a pharmacogenomics testing prior to starting a drug therapy, we can provide counseling tips for the patient, we can help adjust the dosage for the patient even when the patient starts taking that particular medication, we can continue to adjust the doses in order to increase the response to the drug and to avoid any toxicity.

DR. CHARLES J. TURCK:

Now let's sort of jump back and discuss the program that you are heading up at UC San Diego Skaggs School of Pharmacy in pharmaceutical sciences. It is called PharmgenED, but what exactly is the program?

DR. GRACE M. KUO:

Okay. The full name of PharmgenED is Pharmacogenomics Education Program, Bridging The Gap Between The Science And Practice, and we called this name because we know that currently there is not a whole lot of education materials that are readily available to healthcare professionals and we also know from different surveys that are been done previously that there seems to be a gap between the healthcare provider's knowledge about pharmacogenomics and the expectations of our patients regarding a lot of the these pharmacogenomics testing.

DR. CHARLES J. TURCK:

If you just joining us, you are listening to focus on pharmacy on ReachMD, The Channel for Medical Professionals. I am your host Dr. Charles J. Turck, our guest is Dr. Grace M. Kuo, PharmD, MPH, and an Associate Professor at the University of California at San Diego where she is directing PharmgenED, a program aimed at educating healthcare professionals about pharmacogenomics. We are discussing science and practice of pharmacogenomics.

Dr. Kuo getting back to the PharmagenED program, I was wondering who is funding the program and what do you think made them decide that it is a worthwhile investment.

DR. GRACE M. KUO:

The CDC or the Centers for Disease Control and prevention is the funding agency for this PharmgenED program. We are very grateful that they are funding the program because they also understand the need for all of us, not just pharmacists, but physicians and other healthcare professionals to understand better about the pharmacogenomics information.

DR. CHARLES J. TURCK:

What are PharmgenED's goals?

DR. GRACE M. KUO:

We have several goals, for example we want to increase the awareness of current knowledge about pharmacogenomics, the validity and utility of these tests and the potential implications of benefits and harms from use of these pharmacogenomics tests. We also want to reach more than 100,000 healthcare professionals.

DR. CHARLES J. TURCK:

How is the program going to operate?

DR. GRACE M. KUO:

Well, we are very excited about this program. We basically have 2 different components the first one is to provide continuing education for pharmacists and for physicians. A second component is a shared curriculum for colleges of pharmacy around the country so that we can provide some of the basic fundamental information about pharmacogenomics and other professors throughout the country will also chip in and share their materials for education purpose.

DR. CHARLES J. TURCK:

So, in that case would a school of pharmacy say contact you instead of sort of a distance learning type program?

DR. GRACE M. KUO:

It would not be a structured distance learning program, but it will be a platform where a lot of the faculty members can have access to that program or to the curriculum as we share the curriculum, as we share the evidence through a lot of the articles that are already published in the peer review journals. We have an open access program that can retrieve some of these articles from the National Library of Medicine and so we have the very innovative tools including using technologies similar to YouTube, Facebook, and Interface with the National Library of Medicine to provide that material for all the faculty members and all the schools, who are interested in sharing the curriculum.

DR. CHARLES J. TURCK:

Where exactly in development is PharmgenED? Does it have some tools available and you are still working on others?

DR. GRACE M. KUO:

We are still working and on the program. This is a very new program, we just received the funding about 3 months ago and so at this point we are compiling all the educational materials, especially the continuing education modules, there will be 2 modules. The first one would be more of a primer about pharmacogenomics, just describing what pharmacogenomics is and about <____> about basic fundamental understanding of pharmacogenomics and the second module will be more of a clinical application about how pharmacogenomics can be applied to different disease states, so our target goal is to have our <____> life conference with the American Pharmacist Association annual meeting in April of 2009. Soon after, we will have these modules and the materials available online, so that people can log on to the web site in order to complete their CE credits.

DR. CHARLES J. TURCK:

How would you like to see this program most directly impact the practice of pharmacy?

DR. GRACE M. KUO:

Well. I am very interested wanting to help patient improve their drug therapy and to avoid and decrease the events of adverse drug reactions and so I am hoping that this particular program would help educate healthcare professionals, so that we will be able in turn take better care of our patients. Right now, there are a lot adverse drug events that we can prevent, part of those I believe is due to the fact that we don't have the evidence or we do not even know how to apply the evidence into our daily clinical care.

DR. CHARLES J. TURCK:

We would discuss the feature of pharmacogenomics just a little bit earlier, how about the feature Pharmgen add what sort of measurable end points do you hope to see come out of the program?

DR. GRACE M. KUO:

Sure as that we already mentioned we are aiming pretty high to reach 100,000 pharmacists and physicians and other healthcare educators, or even public health professional or genetic counselors and it is my hope that through sharing resources and information about pharmacogenomics, a field that is developing so rapidly, this will benefit our patients in terms of their drug therapy, but it is also creating a forum or a platform where we can come together and share resources that we have for each other to use.

DR. CHARLES J. TURCK:

Would it be accurate to say that this is program that you would like to see continue indefinitely?

DR. GRACE M. KUO:

As the field develops and as the need still exists, I think this program will be able to continue. Of course, we are very grateful for the CDC for their funding and the funding is good for 3 years and we are very hopeful, we will be able to establish and build up this platform and once the web site is built up, we are also very hopeful that we will able to continue to serve the healthcare professionals needs as long as we need to.

DR. CHARLES J. TURCK:

Speaking of the web site for those listening health care professionals who are interested in learning more about PharmgenED or potentially become involved with it, where should they go for more information?

DR. GRACE M. KUO:

For now have a web site, our main web site is under development, but it should be online in the next 2-3 months' time and that web site is pharmacogenomics.ucsd.edu. We currently also have a web site that's under Scivee, who is hosting our YouTube and Facebook technology and that particular web site address is www.scivee.tv/node/7981.

DR. CHARLES J. TURCK:

You'd mentioned that you have funding for 3 years from the CDC. I was just sort of curious about what sort of milestones you've setup and what sort of goals during each of those say 3 years or 6 half years that you are looking to accomplish?

DR. GRACE M. KUO:

Well the first year our main goal is to reach the pharmacists and so we are collaborating with the American Pharmacists Association, the American Society of Healthcare System Pharmacists to implement the program during their annual or mid year conferences. Then during the second year, our main targets are other healthcare professionals including physicians, nurses if we can get all the CEs completed by that time, because we have to go through a lot of a paper work for accreditation and the CDC is also helping us complete that component. So we are hopeful that during the first year now with the help the pharmacists, we would like to train the trainer, meaning that pharmacists who have completed our modules if they are interested of serving as a speaker and take the information, which will be free to them, to take the information to actually disseminate materials in their local practice, let's say to their physician groups or to their other nurse groups in their hospitals or in their pharmacies that will be helping us out as well. So we want to see every

year we have different goals and different target audience that we want to reach, and of course the third year, the programs for both the pharmacist CE, the physicians CME, as well as the pharmacy school shared curriculum will be ongoing and we will be actively evaluating the program.

DR. CHARLES J. TURCK:

We have been talking with Dr. Grace M. Kuo about Pharmgen Ed's mission of educating healthcare professionals about the applications of pharmacogenomics and health care practice. Dr. Kuo, thank you so much for joining us.

DR. GRACE M. KUO:

Thank you so much Dr. Turck.

DR. CHARLES J. TURCK:

I am Dr. Charles J. Turck and you have been listening to Focus on Pharmacy on ReachMD, The Channel for Medical Professionals. Please be sure visit our web site at ReachMD.Com featuring on-demand podcasts of our entire library and thank you for listening.