Naturally occurring polyphenols and their potential in disease prevention
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Epidemiological, clinical and laboratory studies have implicated solar ultraviolet (UV) radiation in various skin diseases including premature aging of the skin and melanoma and nonmelanoma skin cancers. Chronic UV radiation exposure-induced skin diseases or skin disorders are caused by the excessive induction of inflammation, oxidative stress and DNA damage, etc. The use of chemopreventive agents, such as plant polyphenols, to inhibit these events in UV-exposed skin has been gaining attention. Chemoprevention refers to the use of agents that can inhibit, reverse, or retard the process of these harmful events in the UV-exposed skin. A wide variety of polyphenols or phytochemicals, most of which are dietary supplements, have been reported to possess substantial skin photoprotective effects. Several polyphenols suppress lipid peroxidation to maintain the cellular status of antioxidant enzymes like superoxide dismutase, catalase and glutathione peroxidase. Due to the NF-κB suppressing effect of polyphenols, some of them (e.g. curcumin, resveratrol, quercetin and green tea polyphenols) have been shown to decrease the expression of chemokines and cytokines. Polyphenols in healthy foods or drinks such as chocolate, red wine, or beer are readily metabolized to phenolic acids and aldehydes by the microflora of the intestine, raising the possibility that these metabolites are responsible for their anti-inflammatory properties. Polyphenols are known for their unique property of activation at multiple levels, through the modulation of MAPK, Akt and NF-κB signaling pathways, inhibiting the production of inflammatory cytokines and chemokines, suppressing the activity of COX and iNOS and decreasing the production of ROS/RNS. Akt plays crucial roles in mammalian cell survival signaling and has been shown to be activated in various cancers. Several phytochemicals including genistein, curcuminoids and catechins are known to suppress the activation of Akt, thus, inhibiting cancer cell growth. Almost all cell types, when exposed to TNF-α, LPS or other stimuli, activate NF-κB and AP-1 transcription factors, leading to the expression of inflammatory genes, such as COX-2, iNOS, cell adhesion molecules, inflammatory cytokines and chemokines. Thus, all the dietary agents that can suppress these transcription factors have the potential of inhibiting the expression of COX-2, iNOS, cell adhesion molecules, TNF-α and interleukins. Several dietary components including resveratrol, curcumin, and green tea catechins have been shown to suppress COX-2 giving the benefit of decreasing the production of reactive oxygen species. The iNOS, which is responsible for the release of free radical nitric oxide, was suppressed by several phytochemicals and dietary agents stimulated with LPS and interferon-γ (IFN-γ). Other sources of the antioxidant properties of polyphenols is their free radicals scavenger features, which is primarily based on their structure.

Biography
Ravendra P.S. Chauhan holds a Master of Science in Biotechnology from Amity University, UP, India. He has been working in the area of herbal research at Amity University since December 2011. He has published one article in peer reviewed international journal and several abstracts in reputed international conferences. He has presented several posters in various national and international conferences and symposia.

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