

Urgent Need for Discovery of Natural Novel Topoisomers in Treatment of Virus Causing Cancer

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Abstract

Viruses are the confusing very minute particles between the living and non living environment; however they are made up of either DNA or RNA surrounded by a protein coat. These minute particles having a capability to enter a living cell and “hijack” the cell’s internal surroundings and can hijack the cell machinery to make more viruses. This can be done by replacing their own DNA (or RNA) with that of the host. This can leads to virus induced resistant cancer. Several viruses are associated with human cancer and these type of cancers are most dreadful and resistant, even the existed synthetics/isolates became useless in continuous use towards these human disasters known as virus induced cancers.

However the growing scientific skills and knowledge developed vaccines to protect against these viral induced cancers, but these vaccines can help only to protect against infections but not kill virus or virus affected cancer cells. Hence there is a very much urgent need of novel molecules / drug leads/ combinatorial alternative approaches to treat these types of cancers targeting common molecular targets like topoisomerases. Even there are differences between eukaryotic and prokaryotic topoisomerases.

No attempt was made whether these novel natural molecules already existed or newly discovered can work on these both human and viral topoisomerases. However this type of combined target therapy will be possible from nature only. Hence the researchers have to focus in this new dimension how natural phytochemicals can work on these multiple topoisomerases. The current editorial mini review focuses briefly on these issues in treating virus induced cancers.

Keywords: Virus induced Cancers; Topoisomerases; Multiple Targeting

Introduction

Virus Induced Cancers

15 percent of all human cancers worldwide may be attributed to viruses representing a significant portion of

the global cancer burden. Both DNA and RNA viruses have been shown to be capable of causing cancer in humans.

Epstein-Barr virus, human papilloma virus, hepatitis B virus, and human herpes virus-8 are the four DNA viruses

that are capable of causing the development of human cancers. Human T lymphotropic virus type 1 and hepatitis C viruses are the two RNA viruses that contribute to human cancers [1].

How Virus can Cause Cancer

The word "virus," gives a misunderstanding that they are responsible for cause of only minor, temporary illnesses, like the cold or 24-hour flu. But some viruses can also cause severe cancers. As the current research is focusing on these immuno-resistant cancers known as virus induced cancers and onco-viruses, vaccines were developed to protect against these types of viral infections and to prevent cancer. However these type of vaccines failed to treat cancers but able to prevent only infections or symptoms. Hence there is a need for novel drugs that can target both virus and human topoisomerases.

One of the potent examples for this type of oncovirus are the human papillomavirus and a vaccine was developed against this type of virus, However vaccine development against many onco-viruses became a challenge and there is a need of focusing on common targets that vaccines/ drugs can act and the topoisomerases will come under this targets [2].

Topoisomerases are Important Targets

The topoisomerases are important for cell growth and these enzymes are definitely a potential targets for these cytotoxic drugs. The quinolones and the coumarins type of natural drugs are important in this type of category. The quinolones (e.g. nalidixic acid and ciprofloxacin) are the best examples.

The coumarin drugs (e.g. novobiocin and coumermycin A1) are also an important category of drugs that can be focused to work on this human and viral topoisomerase targets [3].

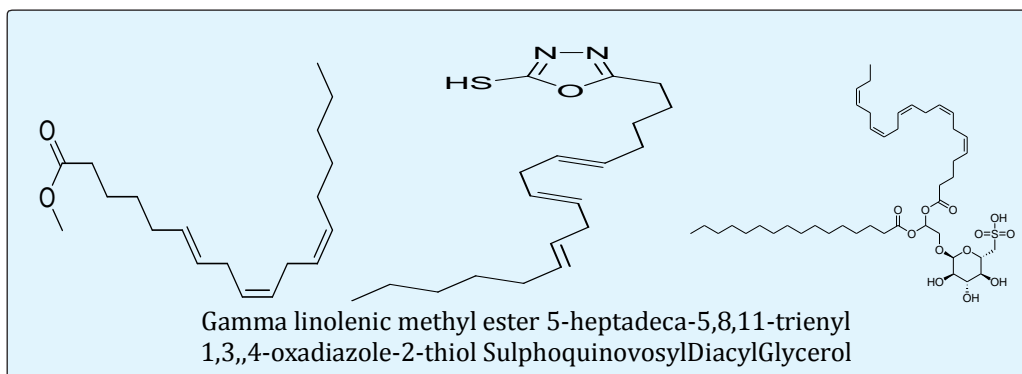
Drug like camptothecin and its derivatives that can widely used in cancer chemotherapy works against or inhibits eukaryotic topoisomerase I [4].

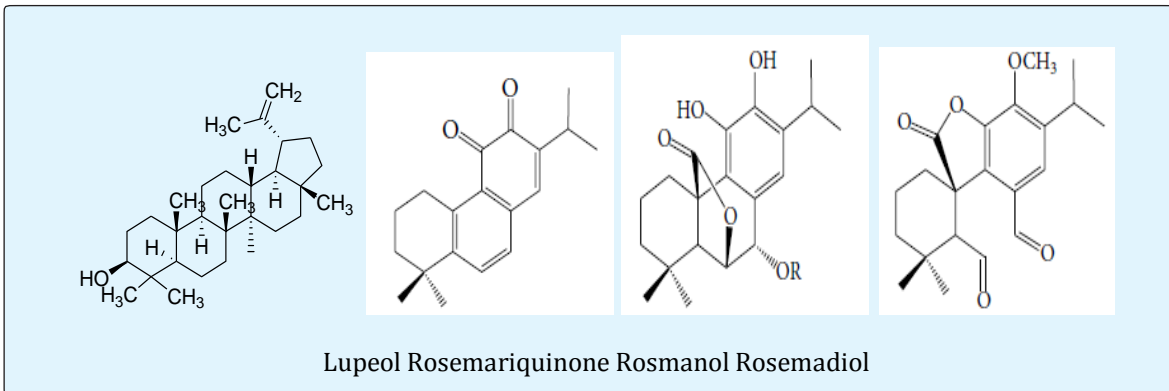
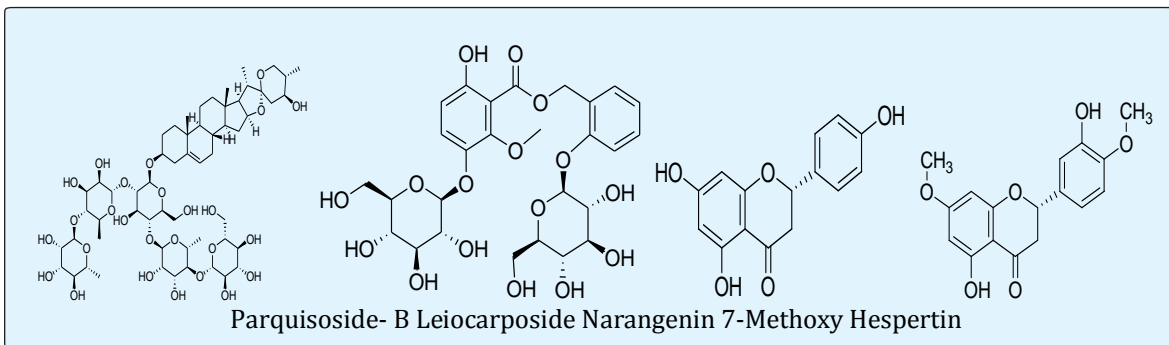
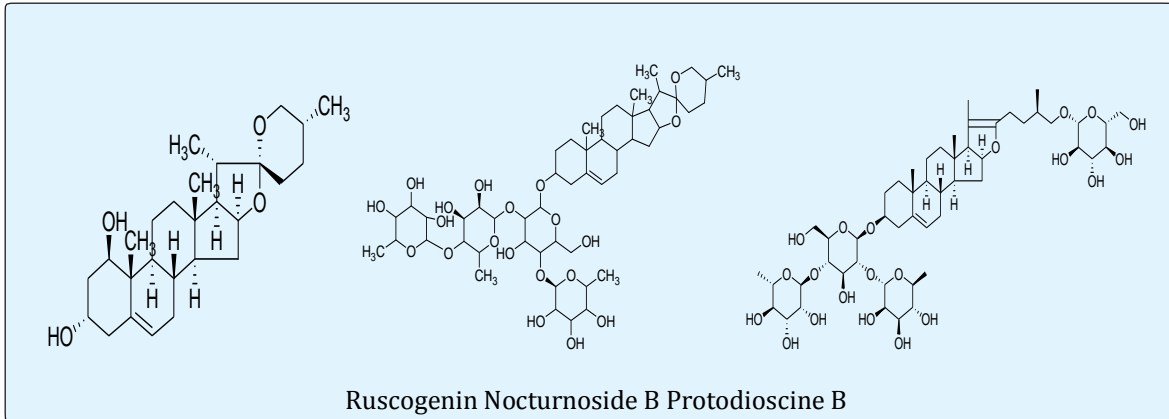
Phytochemicals can be a Drugs in Treating Virus Induced Cancers Targeting Multiple Topoisomerases

Plants	Isolated Phytochemicals
Adonis vernalis L.	Adoniside
Agrimonia eupatoria L.	Agrimophol
Ammi visnaga (L.) Lamk.	Khellin
Anabasis aphylla L	Anabasine
Andrographis paniculata Nees	Andrographolide
Artemisia annua L.	Artemisinin
Atropa belladonna L.	Atropine
Berberis vulgaris L.	Berberine
Brassica nigra (L.)	Allyl isothiocynate
Centella asiatica (L.)	Asiaticoside
Cissampelos pareira L	Cissampeline
Colchicum autumnale L	Colchicine
Crotalaria spectabilis Roth	Monocrotaline
Convallaria majalis L	Convallatoxin
Cytisus scoparius (L.)	Sparteine
Lobelia inflata L.	Lobeline
Silybum marianum (L.)	Silymarin
Rorippa indica (L.)	Rorifone
Sophora pachycarpa Schrenk ex	Pachycarpine
Urginea maritima (L.) Baker	Scillaren A
Rosemarinus officinalis	Rosmarinic acid

Table 1: Various anticancer phytochemicals can be a multiple Topopoisons.

Drug leads to do further Research as Multiple Acting Topopoisons in Virus Induced Cancers





Conclusion

This short editorial review focuses on the virus induced cancers and topoisomerases. These types of cancers are most resistant and need to address urgently by the oncologists. Human topoisomerases and viral topoisomerases are the important targets to treat this type of cancers; however this multiple targeting was neglected by the researchers. Hence this review gives a chance to recall about virus induced cancer and how these isolated phytochemicals/ drugs can be modified to act against human and viral topoisomerases.

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