Department of Pharmacy

BRAC UNIVERSITY
Inspiring Excellence

PHARMA HIGHLIGHTS

ISSUE 50 | NOVEMBER 2018

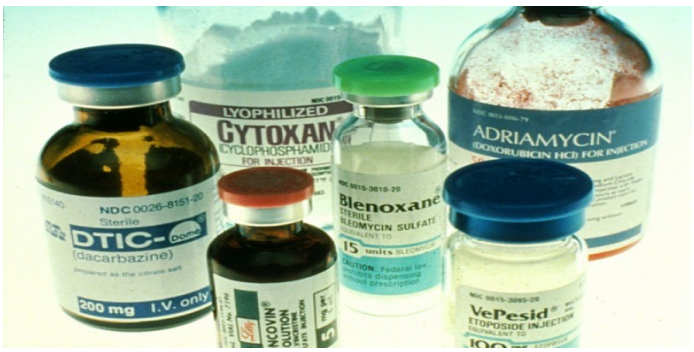
Pharma Poster Challenge 2018: Drug Discovery and Development

The Department of Pharmacy once again hosted the end of semester poster presentation session. The program was held on Wednesday and Thursday, October 24-25, at the BRAC University auditorium. The theme for this year was "Drug Discovery and Development" where students were encouraged to focus on the variegated issues in drug development and present relevant research scopes. The event was sponsored by Beximco Pharmaceuticals Ltd. This initiative was aimed to provide a holistic reflection on student learning and engagement throughout the semester and thus, was pivotal to the inception of novel ideas. The students presented their own ideas amalgamated in a project that was showcased in the form of a poster and presentation. In keeping with the highly demanding global skill sets of modern times, this event was geared to foster teamwork among students in accomplishing a group research project, thereby evincing strong intrapersonal and interpersonal communication skills. Academicians from reputed institutions across the nation, industry professionals from the leading pharma companies and many other distinguished guests were invited and their feedback was collected on our students that resulted in the presentation of recognition awards for the brightest student projects.

Source: DoP, BRACU

Cytostatic Drug Proved Potent For Cancer

Cytostatic drugs, also known as cytostatics are promising in cancer therapeutics as they have the ability to inhibit kinesin spindle formation and thus destroy cancer cells. The therapeutically active molecules are linked to specific antibodies and can therefore treat tumors according to a study published in Angewandte Chemie. One of the proposed way was to attach small drug molecules to an antibody and produce a conjugate. The linker will serve as a bridging component and will hold the conjugate together for as long as it circulates in the blood.



Although incorporating cytostatic drugs into antibody conjugates have been successful so far, their use is limited. Moreover, the drug should also demonstrate minimal side effects that are associated with cancer treatment such as hair loss, nausea etc. Managing the adverse effects may be quite challenging. Researchers are diverging away from the classic mechanisms of cytostatic drugs, and have opted to use cytotoxin that employs a different biological mechanism. The purpose of the study was to establish a new drug that will produce a targeted therapy. Normal cytotoxic agents cannot distinguish between normal and malignant cells, although normal cells have a greater capacity for repair. Cytotoxic drugs act by interfering with cell division, but as this action is not specific to tumour cells, normal cells may also be damaged. Cytotoxin is a novel pyrrole-based kinesin spindle protein (KSP) inhibitor. Low doses of this cytoxin is highly effective enough to inhibiting this step of the cell cycle leading to a strong antitumor effect. The developed conjugates demonstrated potency in vitro and on mice. The conjugates led to complete remission of a human bladder tumor model with minimal side effects, indicating the conjugates could be effective in tumor suppression.

Source: Wiley, Angewandte Chemie International Edition

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Anti-Aging Compounds Now Serve As Probable Drug Candidates for Alzheimer's Disease

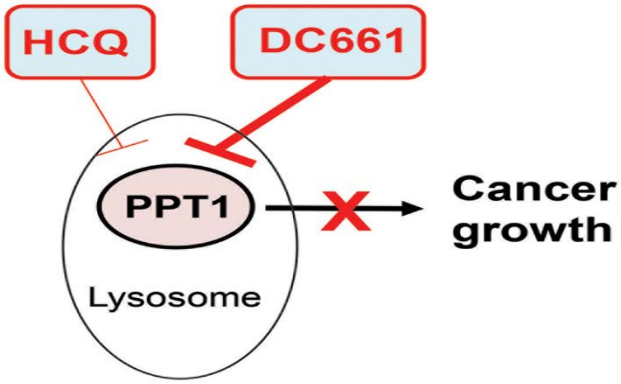
A subclass of anti-aging compounds, called geroneuroprotectors (GNPs), have recently been found to exhibit a possible role in slowing the aging process in mice as stated in a publication titled "Trends in Pharmacological Sciences". As Aging is considered one of the greatest risk factor for Alzheimer's disease (AD), it can be assumed that GNPs may serve as a potential drug candidate. As a progressive neurodegenerative disease, AD initially degrades one's memory, thinking ability and then gradually the capacity to complete simple tasks. It is a normal phenomenon to think that memory loss is common with aging but it actually is not associated with the normal process of aging.

Dave Schubert, head of Salk's Cellular Neurobiology Laboratory argued that if GNPs can work on the mice model, similar effects could possibly be translated or attained with human and therefore it would aid in slowing down the occurrence of other diseases that are associated with aging such as Parkinson's disease, Cancer and AD. Researchers used curcumin and fisetin plant derived compounds, to produce three Alzheimer's drug candidates grounded on their ability to defend neurons in the brain from age-related toxicities. The compounds were CMS121, CAD31, and J147. Curcumin and fisetin are also GNPs which can be commercially made into supplements to provide an anti-aging therapeutic effect.

The newly synthesized compounds were able to lessen the molecular markers of aging and their molecular pathways were linked to the AD drug. Researchers are hoping to get two GNPs, CMS121 and J147, into clinical trials once they have received FDA approval. Lastly, it can be said that if these drugs have benefits for other body systems, they could be used in additional ways to treat or prevent the diseases of aging.

Source: Trends in Pharmacological Sciences, Salk Research Institute

New Anti-Malarial Drug Target in Cancer



While the use of chloroquines isn't new to cancer treatment, the exact biological mechanism of the drugs in slowing down tumor growth are yet to be properly understood. However, scientists at the Abramson Cancer Center of the University of Pennsylvania have reported the potential target of chloroquine in cancer treatment.

In a previous study, they have identified that chloroquines target an enzyme called PPT1 in cancer cells. The enzyme, PPT1, regulates the target of rapamycin (mTOR), which in turn controls that growth and autophagy of cancer cells. The term autophagy means "self-eating" and it refers to a group of catabolic mechanisms involved in the maintenance of cell and tissue homeostasis. Autophagy supports the progression and metastatic dissemination of established tumors, increasing the ability of malignant cells to cope with adverse micro environmental conditions like nutrient deprivation and hypoxia.

Building off their previous work, the researchers used CRISPR/Cas9 gene editing technology to remove PPT1 from cancer cells in the lab and found that removing it slows tumor growth. They also developed a potent chloroquine, known as DC661, that can take advantage of this new treatment pathway.

Identification of this specific molecular target and a potential inhibitor is extremely important as it gives new perspective for ongoing clinical trials involving hydroxychloroquine. Furthermore, new molecules can be developed for targeting PPT1. These newer molecules could be more potent at inhibiting PPT1 than the current chloroquines.

Source: Drug Target Review

Newsletter Editorial Board: Dr. Eva Rahman Kabir, Namara Mariam Chowdhury, Saif Shahriar Rahman and Mohammad Kawsar Sharif Siam