



DAILY NEWS BULLETIN

LEADING HEALTH, POPULATION AND FAMILY WELFARE STORIES OF THE Day

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Women's health and reproductive rights

A half-written promise (The Hindu: 20190423)

<https://www.thehindu.com/opinion/op-ed/a-half-written-promise/article26914712.ece>



Political parties must steer public debate to crucial issues relating to women's health and reproductive rights

The 2019 general election has brought to the forefront hotly contested political issues and promises. But one area of reform that has just not been an important electoral issue is the sexual and reproductive rights of women. While all major parties make some piecemeal promises to women, the recognition of sexual and reproductive rights is almost negligible. This is despite the recent progressive legal work in courts.

The fine print

It is revealing to examine the narrow ways in which political parties have addressed reproductive rights. For example, the Congress manifesto says the party will pass suitable legislation to make registration of marriages compulsory and to enforce the law prohibiting child marriages. The Bharatiya Janata Party's manifesto interestingly focusses on women's menstruation and says it will ensure that all reproductive and menstrual health services are easily available to all women across India. Further, with the expansion of the Suvridha scheme, sanitary pads at a cost of ₹1 will be provided to all women and girls. The CPI(M) has promised to make marital rape an offence and to ensure strict implementation of the Pre-conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act (PCPNDT) Act, which prohibits sex determination tests and female foeticide.

“There are prescriptions without a real sense of the polity in the BJP's manifesto”. Prime Minister Narendra Modi and BJP president Amit Shah release the manifesto for the 2019 Lok Sabha elections, in New Delhi PTI

Notes on the BJP's manifesto

This is the extent to which reproductive rights are understood in India — child marriage, female foeticide, sex selection and menstrual health and hygiene. These are extremely important issues but are selective.

Sexual and reproductive rights in India must include a concern with maternal deaths, access to maternal care to safe abortions, access to contraceptives, adolescent sexuality, prohibition of forced medical procedures such as forced sterilisations and removal of stigma and discrimination against women, girls and LGBTI persons on the basis of their gender, sexuality and access to treatment.

Data on India

India has among the highest number of maternal deaths worldwide (which UNICEF India and World Bank data put at an estimated 45,000 maternal deaths every year, or an average of one maternal death every 12 minutes). Unsafe abortions are the third leading cause of maternal deaths in India. Research by Susheela Singh and others (The Lancet, January 2018) shows that half the pregnancies in India are unintended and that a third result in abortion. Only 22% of abortions are done through public or private health facilities.

While many women in need of caesarean sections still do not have access to it, particularly in low resource settings, many others undergo the procedure unnecessarily, for reasons which are not medically justified, says the report

Maternal deaths following C-sections in low and middle-income countries 100 times those in high-income countries: Lancet

Lack of access to safe abortion clinics, particularly public hospitals, and stigma and attitudes toward women, especially young, unmarried women seeking abortion, contribute to this. Doctors refuse to perform abortions on young women or demand that they get consent from their parents or spouses despite no such requirement by law. This forces many women to turn to clandestine and often unsafe abortions. The Medical Termination of Pregnancy Act, 1971 provides for termination only up to 20 weeks. If an unwanted pregnancy has proceeded beyond 20 weeks, women have to approach a medical board and courts to seek permission for termination, which is extremely difficult. The MTP Act is long overdue for a comprehensive reform.

The Supreme Court, on the other hand, has been extremely progressive on women's reproductive rights. The court in decriminalising adultery and in the Navtej Johar judgment striking down Section 377 held clearly, that women have a right to sexual autonomy, which is an important facet of their right to personal liberty. In the landmark Puttaswamy judgment in which the right to privacy was held to be a fundamental right, the Supreme Court held: "Privacy includes at its core the preservation of personal intimacies, the sanctity of family life, marriage, procreation, the home and sexual orientation... Privacy safeguards individual autonomy and recognises the ability of the individual to control vital aspects of his or her life."

In the case of Independent Thought v. Union of India in the context of reproductive rights of girls, Justices M.B. Lokur and Deepak Gupta held, "The human rights of a girl child are very much alive and kicking whether she is married or not and deserve recognition and acceptance." These judgments have an important bearing on the sexual and reproductive rights of women. The right of women and girls to safe abortion is an important facet of their right to bodily integrity, right to life and equality and needs to be protected.

Political parties, which also represent India's women, have an obligation to take forward the debates on reproductive rights, equality, and access to abortion in political debates as well as in framing laws and policies.

Safe abortions

The responsibility also lies with civil society and development actors to bring up these issues for public debate and in demands. The silence around unsafe abortions is leading to deaths of women and hides important problems that lie at the intersection of these concerns, such as the formidable barriers for adolescent girls to access reproductive health services, including abortion services. The right to safe abortion is an important political issue that must be addressed and widely debated, particularly if parties and leaders are committed to women's human rights.

Access to legal and safe abortion is an integral dimension of sexual and reproductive equality, a public health issue, and must be seen as a crucial element in the contemporary debates on democracy.

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Gene editing

Gene editing may treat lethal lung diseases before birth (The Tribune: 20190423)

<https://www.tribuneindia.com/news/health/gene-editing-may-treat-lethal-lung-diseases-before-birth/762139.html>

Gene editing may treat lethal lung diseases before birth

Since the lung is a barrier organ in direct contact with the outside environment, targeted delivery to correct defective genes is an attractive therapy.

Scientists have used a gene editing tool to thwart a lethal lung disease in animals in which a harmful mutation causes death within hours after birth.

The proof-of-concept study, published in the journal *Science Translational Medicine*, showed that in utero editing could be a promising new approach for treating lung diseases before birth.

“The developing foetus has many innate properties that make it an attractive recipient for therapeutic gene editing,” said William H Peranteau, an investigator at Children's Hospital of Philadelphia (CHOP) in the US.

“Furthermore, the ability to cure or mitigate a disease via gene editing in mid- to late gestation before birth and the onset of irreversible pathology is very exciting. This is particularly true for

diseases that affect the lungs, whose function becomes dramatically more important at the time of birth,” Peranteau said in a statement.

The lung conditions the team is hoping to solve—congenital diseases such as surfactant protein deficiency, cystic fibrosis, and alpha-1 antitrypsin—are characterised by respiratory failure at birth or chronic lung disease with few options for therapies.

About 22 per cent of all pediatric hospital admissions are because of respiratory disorders, and congenital causes of respiratory diseases are often lethal, despite advances in care and a deeper understanding of their molecular causes.

Since the lung is a barrier organ in direct contact with the outside environment, targeted delivery to correct defective genes is an attractive therapy.

“We wanted to know if this could work at all. The trick was how to direct the gene-editing machinery to target cells that line the airways of the lungs,” said Edward E Morrissey, a professor at the University of Pennsylvania in the US.

The researchers showed that precisely timed in utero delivery of CRISPR gene-editing reagents to the amniotic fluid during fetal development resulted in targeted changes in the lungs of mice.

They introduced the gene editors into developing mice four days before birth, which is analogous to the third trimester in humans.

The cells that showed the highest percentage of editing were alveolar epithelial cells and airway secretory cells lining lung airways. In 2018, a team led by Morrissey identified the alveolar epithelial progenitor (AEP) lineage, which is embedded in a larger population of cells called alveolar type 2 cells.

These cells generate pulmonary surfactant, which reduces surface tension in the lungs and keeps them from collapsing with every breath.

AEPs are a stable cell type in the lung and turn over very slowly, but replicate rapidly after injury to regenerate the lining of the alveoli and restore gas exchange.

In a second experiment, the researchers used prenatal gene-editing to reduce the severity of an interstitial lung disease, surfactant protein C (SFTPC) deficiency, in a mouse model that has a common disease-causing mutation found in the human SFTPC gene.

One hundred per cent of untreated mice with this mutation die from respiratory failure within hours of birth. In contrast, prenatal gene editing to inactivate the mutant *Sftpc* gene resulted in improved lung morphology and survival of over 22 per cent of the animals.

Future studies will be directed towards increasing the efficiency of the gene editing in the epithelial lining of lungs as well as evaluating different mechanisms to deliver gene editing technology to lungs.

“The current research is a proof-of-concept study highlighting the exciting future prospects for prenatal treatments including gene editing and replacement gene therapy for the treatment of congenital diseases,” Peranteau said. PTI

Disease germs

Explained: Do airplanes put you at extra risk of catching disease germs?(Theb Indian Express: 20190423)

<https://indianexpress.com/article/explained/do-airplanes-put-you-at-extra-risk-of-catching-disease-germs-5689271/>

According to the researchers, passengers seated one row in front, one row behind, or two seats of either side of an infected flier were within the “perimeter of risk”; those sitting farther away were much safer.

Do airplanes put you at extra risk of catching disease germs?

Research has not provided conclusive evidence of airline passengers being at a greater risk of infection than people in other crowded places. (Getty Images)

Israel’s Ministry of Health said last week that a 43-year-old flight attendant with the country’s national airline was comatose with encephalitis after she contracted measles on a flight from New York City to Tel Aviv, and asked all passengers on board the flight to see a doctor if they developed a fever, or showed other symptoms such as a cough, a runny nose, or a dark red rash.

In February, an adult contagious with measles infected two fellow passengers on a flight to San Francisco from an Asian airport, California health officials said this month.

A large number of cases of measles this year in the United States — which eliminated the virus in 2000, but is currently in the middle of a major outbreak — have been linked to people who flew into the country on airplanes. A total 81 flights were investigated in 2018 for carrying at least one infected person, up from 15 in 2017 and 10 in 2016.

Does flying increase the risk of contracting a communicable disease?

In general, according to the WHO, research shows “there is very little risk of any communicable disease being transmitted on board an aircraft”. The quality of the air in the cabin is carefully controlled: ventilation rates provide a total change of air 20-30 times per hour, and recirculation systems recycle up to 50% of the air, with recirculated air being passed through filters similar to the ones used in hospital operating theatres and intensive care units. Also, the risk of infection from a passenger seated in the same area of the plane isn’t any more

compared to the risk in a train, bus, or other crowded places. During the SARS outbreak of 2003, the risk of transmission of the disease in aircraft was found to be very low, says the WHO.

That said, measles is among the world's most contagious viruses. Unlike influenza pathogens, which spread with sneezes or coughs, the measles virus hangs in air like dust for up to two hours. Also, as a report in The New York Times pointed out, while a person with influenza was likely to infect two unimmunised others, one infected with measles could give the disease to up to 19 individuals who had not received the measles, mumps, rubella (MMR) vaccine.

How Notre Dame Is The Most Important Witness Of French History

In general, the unimmunised, the very young, and those with weakened immune systems due to cancer or other serious diseases, are more vulnerable. Exactly where in the aircraft you sit in relation to an infected person also matters greatly, research published in the Proceedings of the National Academy of Sciences (PANS) of the United States of America in April 2018 showed.

According to the researchers, passengers seated one row in front, one row behind, or two seats of either side of an infected flier were within the "perimeter of risk"; those sitting farther away were much safer. Which underlined that the risk came from proximity to an infected person, and not from being on an aircraft per se with them. "Modern aircraft are becoming increasingly better about their air circulation, and it's changed actually much more frequently now than your average office building," lead researcher Vicki Stover Hertzberg was quoted as saying in media reports on the study.



Key malaria vaccine

Key malaria vaccine set for field trial (The Times of India: 20190423)

<https://timesofindia.indiatimes.com/world/rest-of-world/key-malaria-vaccine-set-for-field-trial/articleshow/69000514.cms>

Alzheimer's

New synthetic peptide may help treat Alzheimer's (The Times of India: 20190423)

<https://timesofindia.indiatimes.com/home/science/new-synthetic-peptide-may-help-treat-alzheimers/articleshow/69000828.cms>

Neurons in the human brain make a protein called amyloid beta. (AP)

Neurons in the human brain make a protein called amyloid beta. (AP)

Scientists have developed synthetic peptides that target and inhibit build up of small, toxic proteins which trigger Alzheimer's disease. The research may pave the way for treating the neurodegenerative disorder at an early stage.

Alzheimer's is a disease of aggregation. Neurons in the human brain make a protein called amyloid beta. Such proteins on their own, called monomers of amyloid beta, perform important tasks for neurons. However, in the brains of people with Alzheimer's disease, amyloid beta monomers have abandoned their jobs and joined together.

Researchers at the University of Washington in the US have developed synthetic peptides — which are designed to fold into a structure known as an alpha sheet — can block amyloid beta aggregation at the early and most toxic stage when oligomers form.

Publik Health

People set hospital afire in Peshawar (The Times of India: 20190423)

<https://timesofindia.indiatimes.com/world/pakistan/people-set-hospital-afire-in-peshawar/articleshow/68997340.cms>

Read more at:

http://timesofindia.indiatimes.com/articleshow/68997340.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

Genetic variants

Genetic variants that protect against obesity could aid new weight loss medicines (New Kerala: 20190423)

<https://www.newkerala.com/news/read/131611/genetic-variants-that-protect-against-obesity-could-aid-new-weight-loss-medicines.html>

According to recent study researchers have found a gene in people from the UK that protect them from obesity, type 2 diabetes, and heart diseases. Researchers also claim that the latest discovery could lead to the development of new medicines that could help to achieve or maintain weight-loss.

The details were published in the Journal of Cell.

Scientists have known for several years that genes can influence a person's weight. One of the gene (MC4R) plays a key role in regulating weight.

"This study drives home the fact that genetics plays a major role in why some people are obese -- and that some people are fortunate enough to have genes that protect them from obesity," says Professor Farooqi, one of the researcher.

The discovery adds to recent work by the team which showed that some slim people have a genetic advantage when it comes to maintaining their weight.

"It doesn't mean that we can't influence our weight by watching what we eat, but it does mean the odds are stacked against some people and in favor of others," added Professor Farooqi.

When the researchers looked in detail at the genetic variants in laboratory experiments, they found that MC4R can send signals through a pathway -- known as the beta-arrestin pathway - that had not previously been linked to weight regulation.

"A powerful emerging concept is that genetic variants that protect against disease can be used as models for the development of medicines that are more effective and safer. Our findings may pave the way for a new generation of weight loss therapies that activate MC4R preferentially via the beta-arrestin pathway," said Dr Luca Lotta, Senior Clinical Investigator

"Genetic studies of thousands of people and a functional understanding of the mechanisms behind protective genetic variants can really help us inform the development of a new

generation of medicines for common diseases like obesity and diabetes that affect millions of people globally."

Hair problems

Five easy fixes for your worst summer hair problems (New Kerala: 20190423)

<https://www.newkerala.com/news/read/131539/five-easy-fixes-for-your-worst-summer-hair-problems.html>

The summer heat has begun gracing us all and hair problems due to extreme heat cannot be ignored. Here are some easy and quick remedies for healthy hair!

"Sun UV rays are extremely damaging to the hair. Protection of hair by using hats, headscarves, turban, etc are very important to maintain its freshness and quality," said Shahnaz Husain, a beauty expert.

Beat the heat with these simple home remedies instead of costly spa treatments.

Dehydrated and dry hair

Natural dryness or dryness caused by chemicals both need regular moisturizing. Here is what needs to be done to remedy the situation.

Apply oil for five minutes daily before washing the hair. Use mustard/coconut oil for this treatment as any physically processed oil is best for hair. Keeping the body hydrated is a must and don't forget to avoid hot styling tools and sun.

Dullness

It happens when hair is not maintained well during summers. If hair texture is oily or normal, apply henna mixed with water and a spoon of curd. Henna should be applied only for 15 minutes before wash. This gives good control to oily scalp and adds natural gloss to the color of hair. It also adds bounce to flat hair.

Split ends

Every girl experiences split end troubles which make hair look rough and out of style. Sadly, split hair cannot be treated with any kind of products. Once you have it, you have to cut it. Best is to be regular with haircuts during summers and be gentle while brushing and washing. If you are regular with preconditioning, there will not be any split ends.

Dandruff

It is common and gets severe if not treated on time. To treat dandruff, it's important to keep hair clean all the time. Wash hair daily with natural water on normal temperature. Avoid hot water bath in summers.

Also, mix turmeric (haldi) with water and apply it on the scalp for 15 minutes before washing once in 15 days. Haldi is very good for treating dandruff but the daily wash is a must. In case of oily dandruff in hair, wash hair frequently and do not apply any hair care pack on the scalp. Consulting a doctor in the case of oily dandruff is a must.

Hair fall

It is something which never leaves you in any season. Hair fall happens because of excessive sweating and heat. Consume a healthy diet, including lots of fluids, salads, seasonal vegetables, etc. Be regular with haircut and cleaning. Preconditioning and daily wash is the most helpful in hair fall.

Apply oil to hair for 10 minutes daily before wash and avoid hair shampoo. If your hair is clean, it will not fall. Haircut takes off the extra weight from the scalp. Also makes ends healthy which work for hair fall. No medicine or treatment works better than preconditioning, wash and cut for hair fall.

Enjoy flawless hair with these easy hair care solutions. Happy summers.

Marijuana

Cancer patients more likely to use marijuana: Study (New Kerala: 20190423)

<https://www.newkerala.com/news/read/131495/cancer-patients-more-likely-to-use-marijuana-study.html>

Many cancer patients use marijuana and its usage has increased, a new study suggests. The findings, published in the journal *CANCER*, indicate 40.3 per cent cancer patients used marijuana within the past year, compared with 38 per cent of respondents without cancer.

"Prospective clinical trials are needed to quantify the efficacy of marijuana in cancer-specific pain as well as the risk of opioid misuse in this patient population," said co-author Kathryn Ries Tringale from the University of California, San Diego.

For the study, 826 people with cancer were matched to 1,652 controls.

The researchers found significantly increased use of marijuana over time -- likely reflecting increased availability due to legislative changes -- but they found stable rates of opioid use.

They found patients with cancer were more likely to use prescription opioids than adults without cancer -- 13.9 per cent versus 6.4 per cent.

"Medical marijuana legislation has previously been associated with reduction in hospitalisations related to opioid dependence or abuse, suggesting if patients are in fact substituting marijuana for opioid, this may introduce an opportunity for reducing opioid-related morbidity and mortality," said lead author Jona Hattangadi-Gluth from the varsity.

Obesity

Obesity can break down protective blood brain barrier, trigger memory loss, finds study (New Kerala: 20190423)

<https://www.newkerala.com/news/read/131327/obesity-can-break-down-protective-blood-brain-barrier-trigger-memory-loss-finds-study.html>

A recent study claims that obesity can break down the protective blood-brain barrier, which can result in memory loss and learning issues, claim researchers.

The details were published in the Journal of Neuroscience.

The blood-brain barrier is comprised of high-density cells which restrict the passage of substances in the body from the bloodstream.

Chronic activation of brain receptor Adora2a that line this important barrier in our brain can let factors from the blood enter the brain and affect the function of our neurons. Researchers have found that when they block Adora2a in a model of diet-induced obesity, an important barrier function is maintained.

"We know that obesity and insulin resistance break down the blood brain barrier in humans and animal models, but exactly how has remained a mystery," says Dr. Alexis M. Stranahan, neuroscientist.

In the brain, adenosine is a neurotransmitter that helps us sleep and helps regulate our blood pressure; in the body, it's also a component of the cell fuel.

Adenosine (the chemical found in living being) also activates receptors Adora1a and Adora2a (brain receptors), which normally supports healthy relationships between brain activity and blood flow.

Problems arise with chronic activation, particularly in the brain, which is what happens with obesity, says Stranahan.

Fat is a source of inflammation and there is evidence that reducing chronic inflammation in the brain helps prevent obesity-related memory loss.

For the study, mice fed a high-fat diet got fat within two weeks. By 16 weeks they increase in fasting glucose and insulin concentrations, all signs that diabetes is in their future.

The investigators saw that obesity first increased permeability of the blood brain barrier to tiny molecules.

When they looked with electron microscopy, they saw a changed landscape. Resulting diabetes promoted shrinkage of the usually tight junctions between endothelial cells and actual holes in those cells.

When they gave a drug to temporarily block Adora2a, it also blocked problems with barrier permeability.

Whether that could work in humans and long term as a way to avoid the cognitive decline in obese humans remains to be seen, Stranahan notes.

Next, they developed a mouse in which they could selectively knock Adora2a out of endothelial cells.

In this transgenic mouse, they turned off Adora2a in the endothelial cells at 12 weeks, and at 16 weeks, when mice should have been exhibiting cognitive impairment and a leaky blood brain barrier; they instead had normal cognition and barrier function and no inflammation.

When they compared the transgenic mice that were on a high- or low-fat diet, they found evidence that the increased permeability of blood vessels in the brain initiates the cycle of inflammation and cognitive impairment.

While it's typically hard to jump from mice to men, the fact that this type of work actually started with human findings likely means that avoiding insulin resistance could potentially halt the increased permeability of the blood brain barrier and decrease in cognitive function, Stranahan says.

"If an individual has already progressed to insulin resistance, these studies underscore the importance of controlling blood sugar levels and avoiding progressing to insulin deficiency (diabetes), which opens the blood brain barrier even further."

The scientists report that the relative accessibility of blood vessels in the brain may also make them a good avenue for preventing obesity's effects on the brain.

It also points to the reality that a variety of drugs given to obese patients may impact their brains to a higher degree, which might be something for patients and their doctors to consider.

Some commonly prescribed drugs like prednisone, on the other hand, already are really good at getting through and can potentially be bad for the brain, she says.

The researcher notes that the brain is a huge consumer, sucking up 70 to 80 percent of our oxygen and glucose, but also more fragile than other tissues, super sensitive even to our own immune cells.

Chronic infection by Hepatitis B virus

Study uncovers mechanism behind establishment of chronic infection by Hepatitis B virus (New Kerala: 20190423)

<https://www.newkerala.com/news/read/131248/study-uncovers-mechanism-behind-establishment-of-chronic-infection-by-hepatitis-b-virus.html>

A research has found the mechanism behind the establishment and maintenance of persistent infection by Hepatitis B virus (HBV). It could help in the development of new therapeutic strategies.

The research has been published in the PLOS journal.

HBV is a blood-borne pathogen that chronically infects approximately 350 million people worldwide, and more than 780,000 patients die annually due to HBV related liver diseases.

Chronic HBV infection is associated with impaired virus-specific T-cell responses. Myeloid-derived suppressor cells (MDSCs) are immune cells known to play a critical role in impairing anti-viral T-cell responses.

In addition, the Hepatitis B e-antigen (HBeAg)- a Hepatitis B viral protein- may represent a viral strategy to establish persistent infection, but the mechanism remains largely unknown.

In the study, researchers examined the mechanisms underlying the expansion of myeloid-derived suppressor cells (MDSCs) and the suppression of T-cell responses in persistent HBV infection.

The researchers analysed the circulation frequency of MDSCs in 164 patients with chronic HBV infection and 70 healthy donors.

They found that the frequency of circulating MDSCs in HBeAg-positive patients is higher than in HBeAg-negative patients. Moreover, HBeAg induced the expansion of MDSCs through the upregulation of a molecule called indoleamine-2, 3-dioxygenase (IDO), which plays a critical role in the suppression of T-cell proliferation.

According to the authors, the findings suggest a novel mechanism in which HBeAg-induced MDSC expansion impairs T-cell function through the IDO pathway and favours the

establishment of persistent HBV infection. The HBeAg-MDSC-IDO axis may, therefore, serve as an immunotherapeutic target of chronic hepatitis B.

"HBV has many tricks to mess up the host immune system for maintaining a persistent infection, HBeAg is one of the culprits. Breaking the HBeAg-IDO-MDSC nexus may hold promise for developing new HBV therapeutics to treat HBeAg-positive patients," said the authors.

Alzheimer's disease

Scientists develop synthetic peptide that could inhibit toxic aggregates in Alzheimer's disease

<https://www.newkerala.com/news/read/131133/scientists-develop-synthetic-peptide-that-could-inhibit-toxic-aggregates-in-alzheimers-disease.html>

Researchers have developed synthetic peptides that could target and reduce toxic protein aggregates, which are supposed to cause Alzheimer's disease, a new study finds.

The study was published in the Proceedings of the National Academy of Sciences.

Alzheimer's is a disease caused by the aggregation of the toxic protein. Neurons in the human brain make a protein called amyloid beta. Such proteins on their own, called monomers of amyloid beta, perform important tasks for neurons.

But in the brains of people with Alzheimer's disease, amyloid beta monomers abandoned their jobs and get joined together. First, they form oligomers- small clusters of up to a dozen proteins- then longer strands and finally large deposits called plaques.

For years, scientists believed that plaques triggered the cognitive impairments characteristic of Alzheimer's disease. But newer research implicated the smaller aggregates of amyloid beta as the toxic elements of this disease.

The research reported that the synthetic peptides- which are designed to fold into a structure known as an alpha sheet- can block amyloid beta aggregation at the early and most toxic stage when oligomers form.

The team showed that the synthetic alpha sheet's blocking activity reduced amyloid beta-triggered toxicity in human neural cells grown in culture, and inhibited amyloid beta oligomers in two laboratory animal models for Alzheimer's.

These findings add evidence to the growing consensus that amyloid beta oligomers- not plaques- are the toxic agents behind Alzheimer's disease.

The results also indicated that synthetic alpha sheets could form the basis of therapeutics to clear toxic oligomers in people, according to corresponding author Valerie Daggett.

"This is about targeting a specific structure of amyloid beta formed by the toxic oligomers. What we have shown here is that we can design and build synthetic alpha sheets with complementary structures to inhibit aggregation and toxicity of amyloid beta while leaving the biologically active monomers intact," said Daggett.

Using both novel and conventional spectroscopic techniques, Daggett's team observed the individual stages of development of amyloid beta clusters, from monomers to six- and 12-protein oligomers all the way up to plaques, in human neural cell lines.

The researchers confirmed that the oligomer stages were most toxic to the neurons, which agrees with clinical reports of amyloid beta plaques in the brains of people who don't have Alzheimer's.

"Amyloid beta definitely plays a lead role in Alzheimer's disease, but while historically attention has been on the plaques, more and more research instead indicates that amyloid beta oligomers are the toxic agents that disrupt neurons," said Daggett.

The synthetic alpha sheet also protected laboratory animals from toxic oligomer damage. In brain tissue samples from mice, the team observed an up to 82 per cent drop in amyloid beta oligomer levels after treatment with a synthetic alpha sheet peptide.

Administering a synthetic alpha sheet to living mice triggered a 40 per cent drop in amyloid beta oligomer levels after 24 hours.

er's disease, treatment with synthetic alpha sheets delayed the onset of amyloid-beta-induced paralysis.

For the current study, the researchers also created a novel laboratory assay that uses a synthetic alpha sheet to measure levels of amyloid beta oligomers. They believe this assay could form the basis of a clinical test to detect toxic oligomers in people before the onset of Alzheimer's symptoms.

"What we are really after are potential therapeutics against amyloid beta and diagnostic measures to detect toxic oligomers in people. Those are the next steps," said Daggett.