Section 1: Harnessing the Innate Immune System to Fight Alzheimer’s Disease
By: Henrieta Scholtzova, MD, PhD and Louisa Bokacheva, PhD

Immunotherapy, a treatment that recruits the immune system to fight illness, is currently a topic of intense research interest. With the support of the NYU ADRC, Henrieta Scholtzova, MD, PhD, investigates a new therapy that cues the immune system to attack and destroy amyloid beta plaques and tau tangles, which are harmful proteins associated with Alzheimer’s disease.

A recent study, led by Dr. Scholtzova and published in the June 15 issue of Brain, has shown that in aged non-human primates, treatment with CpG oligodeoxynucleotides (CpG ODNs) reduced amyloid beta plaques by 59%, compared with untreated animals. This immunotherapy also improved the animals’ cognitive functions: treated elderly monkeys solved puzzles and learned to navigate a maze better than aged monkeys that did not receive treatment.

The CpG ODNs are synthetic compounds that contain cytosine-phosphate-guanine (CpG), a short DNA motif usually found in bacteria and viruses. CpG ODNs are recognized by TLR9 receptor on various immune system cells, including the cells of the innate immune system, the body’s first line of defense against infection. In response to CpG ODNs, activation of the innate immune system may help the immune cells in the brain recover their function and become more effective at removing amyloid beta plaques and tau tangles. In clinical trials of human vaccines and therapies for infectious diseases and cancer, CpG ODNs have shown excellent safety profiles.

In this study, treatment with CpG ODNs did not cause excessive inflammation or microbleeds—challenging complications that often limit immunotherapy studies.

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Neurologic manifestations of COVID-19 patients range from patients, at hospitalization in 63% of patients, and at any time during neurologic manifestations were present at Covid-19 onset in 42% of a study conducted within a large hospital network in Chicago, Illinois, affect the nervous system, with damage and neurologic alterations. In coronavirus 2 (SARS-Cov-2), the etiologic agent of COVID-19, can deaths reported. However, the effects of COVID-19 on the nervous Vietnam War, and the Korean War altogether. Well-known pulmonary the combined numbers of American lives claimed in World War I, the pandemic has resulted in 33.6 million confirmed cases and over non-specific and moderate symptoms such as headache, muscle pains, and loss of smell or taste to severe symptoms including diseases of blood vessels in the brain and brain infections. Most of the acute severe neurologic symptoms occur only in a minority of patients with usual risk factors and are associated with poor outcomes, including death. However, most COVID-19 patients exhibit only minor or mild neurologic symptoms. More importantly, new research now suggest that there may be long-term neurologic consequences in COVID-19 survivors. Notably, increasing evidence suggest that there may be subtle but real brain damage occurring in many survivors, causing neuropsychiatric, psychological and cognitive problems, that may be indistinct but pervasive.

Further studies of patient survival after an intensive care unit (ICU) stay suggest that many critically ill patients with COVID-19 will face long-lasting physical, cognitive and/or mental health deficits. One study-enrolled adults with respiratory failure in the medical or surgical ICU, and evaluated them for in-hospital delirium, and assessed global cognition and executive function 3 and 12 months after discharge. A longer duration of delirium in the hospital was associated with worse global cognition and executive function scores at 3 and 12 months. These kinds of cognitive deficits in memory, attention, and executive function, in normal daily life may show up as difficulties remembering names, remembering familiar faces and places, having normal conversations, sustaining thoughts, handling finances and medications, understanding written materials, and even being able to function optimally at work. We anticipate similar effects in patients with COVID-19 ICU survivors with possible long-term psychological effects including neuropsychiatric illnesses like anxiety, depression, and post-traumatic stress disorder (PTSD).

In summary, although most patients recover from COVID-19, both short and long-term cognitive and neuropsychiatric effects are a strong possibility. Severe COVID-19 patient experience high levels of pro-inflammatory cytokines and acute respiratory dysfunction and often require assisted ventilation in the ICU. These factors substantially increase the risk of cognitive decline. More importantly, COVID-19 induced direct negative effects on the immune reaction, and possible aggravation of pre-existing cognitive deficits, may ultimately increase the risk of de novo induction of a neurodegenerative disease like Alzheimer's disease. It is therefore expedient for health care providers to provide continued assessment for neurocognitive deficits in COVID-19 survivors.

Section 3: Word Search

Alzheimer's word search

Section 4: ADRC New Procedures

By: Arjun Mazurkar, MD, PhD and Rachel Weintrob-Brida, PhD

We at the NYU ADRC want to remain at the forefront of the Alzheimer’s disease (AD) field as new ideas and techniques move us towards better diagnostics and therapies. In an effort to revamp our research, we have added several innovative and cutting-edge procedures to our ADRC study. These new methods are in the domains of imaging scans and digital biomarkers.

1. Imaging scans: The gold standard way to confirm AD is to show amyloid plaque and tau-based tangles upon autopsy, which had been a limitation for AD research focusing on early stages. In recent years, chemical tracers for amyloid and tau have been developed, that when used with Positron Emission Tomography (PET) scans, enable non-invasive confirmation of amyloid and tau in living persons. This enables a safe and innovative way to image markers of AD in the brain and determine their influence on cognition, behavior, and function. We are implementing amyloid PET and tau PET scans that, when combined with MRI, permit state-of-the-art research on AD risk and help identify and differentiate AD from other neurodegenerative diseases.

2. Digital biomarkers: The early stages of AD and related dementias may go undetected because current methods are not sensitive enough to detect and track subtle problems. To capture these early changes, we are harnessing advances in mobile and wearable technologies to track “digital biomarkers.” First, we are quantifying the gait of our participants using a walkway embedded with sensors. Gait changes can indicate a decrease in walking speed, an inconsistency of stride, and other changes which can be seen in very early stages of AD and related dementias. Secondly, we are analyzing sleep patterns by providing participants with actigraphy watches that digitally track movements during sleep. While dementia is typically associated with cognitive impairments, it can also lead to problems with sleep, including alterations in daytime activity levels, sleep quality, and wake/sleep patterns. Lastly, we are developing methods to quantify cognitive tests traditionally done on paper. For example, using a digital pen on a tablet, a dynamic tracking of a clock drawing can be analyzed with respect to speed, accuracy, and strategy that may reveal indicators of future decline or stability.

All of these new procedures will be explained in further detail during the consent process and will help in the fight against AD and related dementias. The NYU ADRC is unique and innovative in its focus on early stages of dementia and we will continue to include the most ground-breaking diagnostics for early detection of subtle changes.
Hearing loss is frequently a problem affecting many of us. As we age, although there are many causes of hearing loss the aging process is the most frequently associated condition. A more specific cause is unknown. Age-related hearing loss (ARHL) affects some people as their 7th decade of life (60 years and older) and by the time we are in our 80s, we have as much as 80% chance of being affected. It is important to understand the manifestations and implications of this most common form of hearing loss, AHRL.

What does this mean functionally? ARHL involves the loss of specific cells that sit inside a part of the ear called the cochlea. When it is ARHL, it is never sudden but a gradual loss over years such that we or others might not even notice that there is a problem until it becomes more severe. ARHL typically affects reception of high frequency sounds (think of these as high in pitch) which is why it is often referred to as a “high frequency” loss. The sounds which are high in pitch are not easily detected and become more difficult to hear as we age. ARHL affects the cochlea, the part of the ear where mechanical sound waves are converted to electrical neural signals in the brain. When hearing is difficult, it can be frustrating and tiring, leading one to give up on the conversation and although remaining present, no longer being attentive.

How does hearing loss affect the brain and can this cause dementia? We have brain imaging evidence that hearing loss leads to using different physical places in our brains to process sound. Our brains adjust to using other regions than those that were used before to accommodate sounds. We have learned about this cross-modal plasticity or the ability of an intact sensory modality to take over functions of a deprived sensory modality from auditory development studies in children, from mouse studies and more recently from imaging studies in adults. In fact, the hippocampus, shows more inflammation and deterioration when hearing is negatively impacted. Other studies have shown associations between hearing loss and cognitive decline but this does not mean that hearing loss is the cause of cognitive decline, rather research is needed to understand these relationships and this is ongoing.

How can you improve your ability to hear well? Beyond seeing an audiologist who can help optimize hearing via a variety of interventions or protecting hearing from environmental noise, there are other things one can do to address this problem. See your doctor to be sure that you have not accumulated a large amount of ear wax which can once removed can restore some amount of hearing. In conversation with others, try to limit background noise and make sure you are able to see the speaker’s face for adequate lip reading and use of facial expression – something we all use in communication to fill in the gaps for where we are not sure we have heard clearly. There are hearing assistive technologies that serve as personal sound amplifiers which can be bought over the counter. You can also download an application to your smartphone (if you have one) and use it as an amplifier with ear buds or a headphone. Stay engaged with others! Don’t let any difficulty with hearing lead to new strategies including hearing aids to improve your “auditory wellness” if this has become more difficult.

Since the objectively measured audiologic profile is not always predictive of functional hearing capacity, assessing hearing difficulty through a self-report approach systems like the one developed in Oregon offers many advantages. There are specific validated tools to determine “subjective” hearing difficulty.

Why is hearing so important? Hearing is a social sense. We need to hear to communicate. We rely on understanding another’s speech and hearing the words correctly for effective communication. When we have difficulty hearing, Alzheimer’s research requires more effort and that effort (sometimes referred to as cognitive load) can be fatiguing. The effort required can be significant enough to require so much energy directed to hearing words that there is no capacity to really listen in a way that allows one to work with the information while in conversation and encode it for remembering easily after the conversation. This is like being a note-taker during a lecture and then being more reliant on rereading the notes to recall what was said. When hearing is really difficult, the effort required to listen can be very frustrating and tiring, leading one to give up on the conversation and although remaining present, no longer being attentive.

How do we measure hearing function? Hearing ability is most commonly measured in a sound booth where the audiologist can control the level of background noise such as when in a noisy public place like a restaurant. Hearing Loss and Aging

By: Joshua Chodosh, MD and Barbara E. Weinstein, PhD

in Public Administration and Social Science, University of Florida and holds Master's degrees in Business Administration from Florida International University.

Rachel Weintraub-Brevda, PhD has taken on a new role at the ADRC as Program Manager for Professional Education. Rachel will work closely with our Neuropathology Core on the Brain Donation Program as well as conducting some neuropsych testing with our participants. Rachel comes to the Center for Cognitive Neurology from the Neuroscience Institute, where she developed many education and outreach initiatives. Before joining NYU Langone, Rachel received her PhD in Cognition, Brain, and Behavior from the Graduate Center, CUNY, where she investigated emotional memory and attention in the brain. When she is not at work, Rachel enjoys spending time with her family and reading about all things!

Zena Rockowitz is our new Recruitment Coordinator for the ADRC, clinical trials, and affiliated studies. She studied psychology at the University of Florida and holds Master’s degrees in Public Administration and Social Work from Florida State University. Her background is in policy and outreach with a focus on geriatrics/health care. Despite growing up in Miami, Florida, raised with sunshine and warm beaches, she spent the last seven years in rain packed in Portland, Oregon. She recently came to New York with two cats in tow (Kitty-Boy and Bunny). Favorite pastimes include reading novels, camping, biking, and exploring the greatest city in the world (NYC).

Natasha De La Cruz is the ADRC’s new Multicultural Program Coordinator. Natasha is a New Yorker at heart, having been born and raised in Queens, New York. When she was eight years old, her family moved to the Dominican Republic where she was able to get a true feel for the amazing culture and community. Natasha received her bachelor’s degree in Psychology from La Universidad Autónoma de Santo Domingo (UASD) and previously worked in the San Vicente de Paul Hospital’s psychology department before returning to the states. She continued her career working at Clinilabs Drug Development Research and Columbia University’s Taub Institute for Research on Alzheimer’s disease and the Aging Brain. Natasha currently lives in New Jersey with her fiancé and two cats, Frankie and Rebecca. She enjoys reading, gardening, and walking with friends.

Charlotte Kwong is an undergrad at NYU majoring in political science. She recently received the premied track. She has joined the ADRC as a student resident intern working with our Data and Biomarker Core. A little bit about Charlotte: She is a student-athlete at NYU for Women’s Golf and has been playing golf since she was five years old. Charlotte does not let hearing loss cases stop her from working hard and overcoming challenges. She is based between Hong Kong and then came overseas to the United States for high school and college to seek better academic and athletic opportunities. Charlotte plans on pursuing a career in the medical field and is still exploring the subspecialties, but is very interested in neurology and is very fascinated! Charlotte says “I love the research projects that the ADRC is conducting and being part of the team has been such a joy”.

Jon Links joined the team a few months back as a Research Data Associate here at the Vilcek Institute of Biomedical Science. Jon graduated from NYU, where he majored in Biology, and is currently working on obtaining his Masters in Biomedical Informatics at the Vlcek institute of Biomedical Sciences. Outside of work, Jon enjoys listening to music, photography, cooking, and bouldering!

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Section 7: Participant Spotlight: Interview with Debra Bramlett aka “Sweet Aminata”

By Marlena Gordon, MSW

Debra is a 65-year-old African American writer/poet living in Downtown Brooklyn. She was first drawn to “magical” Brooklyn from Saint Louis in her mid-20s after reading the inspiring works of the Harlem Renaissance authors. She has been in New York for four decades now, throughout which time she has written countless inspiring works herself.

Over the last 10 years however, she has been embarking on other creative ventures under the name “Sweet Aminata” which means “big heart” in Senegalese (loosely translated as “sweet heart” in English). Now in addition to her poetry, she pairs her writing with artistic pieces to further illustrate her words and engage all the five senses. She presents these projects all over New York; from Riker’s island as part of her volunteer work, to county fairs. You too can view some of her works on YouTube at tinyurl.com/fp3sjb9j and at tinyurl.com/ty75qrd. The latter even includes a video of Wanda Sykes reciting one of her poems! Currently, she is also working on a book about her family history, which she hopes to release in December. For fun, Debra loves to bake and cook. She considers it an extension of her artistic persona, as she loves to perfect recipes creatively improvised from scratch. Her specialty is healthy soul food, but she also likes to bake cookies to use as part of her interactive poetry readings (you can use the link above to see some of her incredible looking muffins). Debra also spends her spare time contributing to research as part of The NYU Alzheimer’s Disease Research Center’s (ADRC) Longitudinal Study, which she has been a part of for almost 3 years.

Below is snippet from our interview regarding her research experience.

What first inspired you to contribute to AD research?

A few years back I attended an outreach event hosted by the NYU ADRC. There they explained that research often lacks participation from people of color (POC) and that such a lack could lead to negative health outcomes for society as a whole, and for African American communities in particular. For that reason, I felt compelled to contribute. I was also encouraged by the fact that NYU’s staff was comprised of diverse individuals, which made me feel at ease and trusting that the ADRC was not merely “talking the talk” without a real investment in POC; they were actually “walking the walk”.

Additionally of course, as an artistic person, the idea of studying my very own creatively wired brain (from which my art emanates) just seemed fascinating!

What do you get out of the ADRC experience / is the most gratifying part of the experience?

I feel of worth both because I am (1) providing important data which will benefit the lives of future generations and POC especially, along with the fact that (2) the ADRC staff really respect what I have to offer despite my doubts about my own perceived shortcomings at times. They hear me and deem the things I say of value. It is also just amazing to get to know my own brain, and to have scientific confirmation of the things I already suspected about myself: my biology and why I am the way that I am.

What might you tell someone who is trying to decide whether to participate in AD research?

I would say they SHOULD participate. If they were feeling anxious about the prospect, they would do well to understand that the research team never makes you do anything you do not want to, nor is there anything invasive about the experience at all; you are merely “talking the talk” without a real investment in POC; they are actually “walking the walk”.

SWS = slow wave sleep

The functions of sleep
- Consolidation of memories
- Restoration
- Bodily repair
- Energy conservation
- Release of hormones that govern growth and reproduction

I Know Why the Caged Bird Sings by Maya Angelou

What do you think of the ADRC’s work?

It reminds me of one of my favorite quotes “one should never cease chiseling one’s own statue”; the ADRC pushes me to keep chiseling my statue, and would likely do the very same for them.

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Finally, one last fun question: As you are a writer yourself, what is your favorite poem and/or book that you might recommend to others in the ADRC?

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