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INDIANA ALZHEIMER DISEASE CENTER NEWSLETTER
INDIANA UNIVERSITY SCHOOL OF MEDICINE
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Reflections

iADC Indiana Alzheimer Disease Center

iADC's Dr. Andrew Saykin and colleagues Helped Discover Newest Gene Associated with Alzheimer Disease

A new study published August 7, 2009 in the journal PLoS One by University of California at Irvine (UCI) found that variation in a gene called TOMM40 appears twice as often in people with Alzheimer's disease (AD) than in those without it. There is no cure yet for AD but it is the leading cause of dementia in the elderly. The new study reported that the harmful form of TOMM40 greatly increases a person's susceptibility when other risk factors—such as having a gene called ApoE-4 are present. People who have ApoE-4 are three times more likely to develop AD.

"The TOMM40 gene influences the ease with which molecules can get in and out of mitochondria, the energy production center and stress mediator of cells. TOMM40 also processes materials that form amyloid plaques, one of the hallmarks of AD", says Dr. Steven Potkin, lead author of the study and UCI psychiatry and human behavior professor. "With aging, the number and function of mitochondria decrease, accompanied by a parallel increased risk of developing AD. This study points to the use of mitochonondrial-based therapies for treating this disease" added Dr. Potkin.

Dr. Andrew Saykin, Director of the Indiana Alzheimer Disease Center (iADC) Neuroimaging Core was also involved in this important study along with several other researchers and scientists including Dr. Michael Weiner of UC San Francisco, and UCI researchers Robert R. Sprague, Fabio Macciardi, Guia Guffanti, Anita Lakatos, Jessica Turner, Frithjof Kruggel and James Fallon. Drs. Li Shen and Tatiana Foroud of the iADC, along with the IU Imaging Genetics Lab and NIH-sponsored NCRAD teams, helped to make this study possible.

Dr. Saykin led the genome-wide analysis of the 822 Alzheimer's Disease Neuroimaging Initiative (ADNI) participants that generated the data reported in this paper. According to Dr. Saykin this study is very important because it points toward several known and novel genes that may play significant roles in risk for AD. More broadly, this paper is the first of

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a series of reports being prepared that integrate advanced brain imaging and genomic methods to study AD. The multidisciplinary team of neuroscientists, imaging experts, geneticists, computer scientists and related specialties at the iADC and IU Center for Neuroimaging have made the integration of brain imaging and genetics data a high priority given the potential of these exciting technologies to facilitate new discoveries. The computational and statistical challenges are significant given hundreds of brain regions and a half million genetic markers and new methods need to be developed for data analysis. Future work will also integrate brain scans and genetic data with cognitive measures such as memory performance. The potential of these new technologies is remarkable said Dr. Saykin but the challenge for our team and our many collaborators is to develop the best strategies to detect the important information, the proverbial "needle in the haystack".

Supporting this recent discovery was additional research presented at the International Conference on Alzheimer's disease in Austria in July 2009. For example, Duke University scientists found that patients with a different variant of TOMM40 developed AD an average of seven years earlier than those without the gene. Dr. Saykin points out that there is a convergence of interest in TOMM40 based on strong signals from several independent genome-wide studies of AD. However, TOMM40 is adjacent to ApoE, the most established risk gene for late onset AD. It is clear that this region or loci is important but exactly how these genes interact remains to be determined. We also need to determine the role of other candidate genes for AD located in different genetic neighborhoods and we think neuroimaging data can help us to connect the dots.

This study was funded by the National Institute of Aging, National Institute of Biomedical Imaging and Bioengineering, ADNI's industry partners through the Foundation for the NIH and a Foundation wishing to remain anonymous. The Alzheimer's Association has also been a strong supporter of ADNI worldwide. In addition, the IU team received support from the Indiana Economic Development Corporation, which provided infrastructure facilitating this collaborative research.

Adapted from Science Daily August 8, 2009

Is a Big Belly Bad for the Brain? Examining Body Fat and Dementia

A number of recent studies, widely publicized in the media, have suggested that excess body fat (adipose tissue), particularly around the belly during midlife may increase the risk of developing dementia, including Alzheimer's disease (AD), during later life.

According to the National Institute on Aging (NIA), "We have two very serious public health burdens—Alzheimer's disease and obesity—and if they interact so that one accentuates the other, then this is obviously a significant crisis", says Dr. Susan Petanceska, a program director in the NIA's Division of Neuroscience. "This is very important to know because if metabolic abnormalities associated with obesity do indeed harm the brain and we are able to understand how that happens, there is a great potential for intervention".

According to Dr. Lenore Launer, chief of NIA's Neuroepidemiology Section of the Laboratory or Epidemiology, Demography, and Biometry, "several epidemiological studies already have show an association between body mass index (BMI) and dementia". BMI is a measurement of body fat relative to height and weight. In support of these findings, there are also, "a lot of interesting new experimental data on proteins such as leptin that are involved in obesity and may indeed be involved in the physiology of brain changes. It is an exciting area that needs to be explored."

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Indiana Alzheimer Disease Center

For world-class diagnosis, treatment, and research on Alzheimer disease and related disorders contact the physician-researchers at the Indiana Alzheimer Disease Center [*i*ADC] by telephone **317-278-3968** or email iadc@iupui.edu.

As the only National Institutes of Health-funded center in the state of Indiana, the *i*ADC conducts cutting edge research on Alzheimer disease and related disorders. Currently, we are looking for adults with:

- Mild memory and cognitive problems
- Alzheimer disease
- Other forms of dementia
- Hereditary dementia
- Healthy older adults

People who are selected for *i*ADC research receive a free clinical assessment including:

- Examination by a neurologist
- Assessment of concentration, memory, and problem solving skills
- Assessment of mood and daily functioning
- MRI and PET scans (selected cases)

Interested people can also be placed on a research registry and made aware of all new research projects including experimental drug studies for Alzheimer disease, other dementias, and mild cognitive impairment.

In order to participate in *i*ADC research studies people should be willing to:

- Complete annual clinical assessments
- Nominate a family member or friend to be interviewed and fill out questionnaires regarding your memory, mood, and daily function
- Consider brain donation at death. A brain autopsy is the **only** way to get a definitive diagnosis.

SCHOOL OF MEDICINE
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Is a Big Belly Bad for the Brain? Examining Body Fat and Dementia

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Research on the biology of fat has shown that there are several types of adipose tissue. Belly fat, also known as visceral fat, is the most damaging type. It wraps itself around organs, making the abdomen protrude and contains molecules that can pass into and interact with the brain. Compared with generalized obesity, excess visceral fat is a bigger risk factor for type 2 diabetes, insulin resistance, heart disease, stroke and premature death, studies show. The fat that coats the hips and thighs, called subcutaneous fat, lies just below the skin, is benign in comparison.

An NIA-funded study found that middle-aged people with large bellies are more likely than are their flat-bellied contemporaries to develop AD later in life. Dr. Rachel A. Whitmer, Kaiser Permanente Division of Research, Oakland, CA and her co-investigators analyzed epidemiological data collected on 6,583 Kaiser members, aged 40 to 45. Almost 16 percent of the entire group eventually developed dementia.

How Do We Measure Belly Fat?

Researchers often use calipers to measure abdominal diameter, which is the distance from the back to the front of the belly. An abdominal diameter of more than 9.8 inches (25 cm) is considered obese. Scientists may also use imaging devices to get a thorough picture of belly fat. Another good tool is a measuring tape. Central obesity is defined as more than 35 inches (89 cm) for women and more than 40 inches (102 cm) for men, but anything over 37 inches (94 cm) of fat may accelerate the aging process.

Much information is available these days about a maintaining a healthy lifestyle. While there are many things we cannot control, there are some lifestyle changes we can make to help us reach and maintain a healthy weight. Always talk to your physician before making any major changes in your diet or starting an exercise program. Some general healthy guidelines include:

- Eat a diet rich in fruits and vegetables.
- Reduce the amount of saturated fats.
- Choose whole grain foods over processed white flour.
- Choose chicken, fish and legumes over red meat.
- Portion control is important, 3 oz of protein is plenty; limit sweet and sugary snacks.
- Try to exercise for a minimum of 30 minutes a day….like a brisk walk. Generally speaking what is good for your heart is also good for your brain.

In a recent article that appeared in a special issue of Current Alzheimer Research, Dr. Petanceska of the NIA posed several important and interesting questions that will need extensive research to answer.

- Does the metabolic syndrome (combination of high triglycerides, cholesterol, blood pressure, blood sugars, and excess belly fat) alter normal brain aging and the transition from normal aging to AD? If so, how?
- Does being underfed or overfed as a baby and during childhood influence how the brain ages?
- Do the different conditions that make up the metabolic syndrome interact to accelerate normal brain aging? If so, what are the mechanisms?
- How do obesity, hypertension, high blood cholesterol and triglycerides, and inflammation affect the brain's microvasculature, the dense and intricate web of small blood vessels that provides nutrients and oxygen to the brain and enables the proper functioning of brain cells?

Says Dr. Petanceska, "to gain a better understanding of AD, we need to begin thinking 'outside the brain' so we can better understand the relationship between the health of the body and the health of the brain".

Adapted from a National Institute of Aging newsletter April 2009

Helping Children Understand Alzheimer Disease

When a family member has Alzheimer disease (AD), it affects the entire family, including children and grandchildren. Giving children basic information about AD can help them cope with the disease in their family. It is important to consider the kind of relationship the child has with that family member and the child's age when deciding what kind of information to tell the child, how to tell the child and whether the child will have any role in caring for the family member with AD.

The Alzheimer's Disease Education and Referral Center (ADEAR—funded through the National Institute of Aging) has many resources about AD that are appropriate for children of all ages. Check out their website at www.niapublications.org/adear. Also, click on the library section at this site. The Alzheimer Association at www.alz.org also maintains a list of helpful resources for children. The resources give more detail about how to talk with and support a child affected by AD. Some suggestions include:

How to help a child understand AD:

- Answer children's questions simply and honestly. For example, you might tell a young child, Grandpa has an illness that makes it hard for him to remember things.
- Help children to recognize their feelings and to know that feeling sad are angry sometimes is normal.
- Comfort them. If children express guilt or feel that they may have done something to hurt their grandparent, reassure them that they did not cause the disease.

If the child lives in the same home as someone with AD:

- Do not expect a young child to help care for the person with AD.
- Make sure the child has time for his or her own interests and needs, such as playing with friends, participating in after school activities or doing their homework.
- Make sure you spend time with your child, so he or she does not feel that all your attention goes to the person with AD.
- Plan special outings for you and the child alone.
- Help the child understand your feelings. Be honest about your feelings when you talk with a child, but do not overwhelm him or her.
- Choose some age appropriate creative time like drawing or writing poetry. This can often help children to express their feelings.

You are a powerful role model for your child. Always treat the person with AD with dignity and respect in your interactions. Children will watch you and see how you act around a person with AD. Show children that they can still talk with the person and encourage them to share their memories with the older person. Young children can draw pictures and then show them and describe them to the person with AD. Doing fun things together, with parental supervision depending on the age or the child, can help both the child and the person with AD. Both children and people with AD tire easily so keep the visits and activities short.

Activities a child can do with a grandparent with AD:

- Walk in the neighborhood
- Do simple arts and crafts
- Listen to music
- Sing

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Current Studies on AD and Related Disorders Research Enrolling Participants

Who is needed?	For which study?	Length of study?	Please contact:
• Persons diagnosed with probable AD, MCI, Lewy Body disease, frontotemporal dementia, mixed dementia, vascular dementia, or Parkinson's dementia	• **Registry of volunteers** for various current and future studies	• Will vary by study • Compensation for time and travel may be provided • Specific details will be provided before enrollment	Julie Dickson, RN 317-278-4333 or 866-257-0195
• Persons diagnosed with AD or MCI	• Learning in Older Adults	• A single two-hour session • Compensation for time and travel	Anne Murphy-Knudsen at 317-274-8002
• Women with probable AD • Post-menopausal • 60 years old + • Currently taking medication for AD	• Study of the effects of *Raloxifene* (Evista) on the symptoms of AD in post-menopausal women	• 4 times per year (once every three months)	Lyla Christner, LPN 317-274-5029 or 866-257-0195
• Persons diagnosed with probable AD • 50 years of age +	• Study of ST101 in AD	• 20 weeks • 7 visits • Compensation for travel provided	Scott Herring, RN 317-274-9903 or 866-257-0195
• Persons diagnosed with probable AD • 50 years of age +	• Souvenaid ® a once a day nutritional drink	• 26 to 28 weeks • 6 study visits • Compensation for travel provided	Julie Dickson, RN 317-278-4333 or 866-257-0195

• Persons with possible early stage AD • 45-90 years of age	• BMS-708163 taken orally • Study includes (free of charge): Blood draws EEG, spinal tap, CT or MRI brain scans, vital signs, memory testing during some visits and routine physician visits	• 13-month study • Monthly study visits lasting from 2-5 hours.	Lyla Christner, LPN 317-274-5029 or Julie Dickson, RN 866-257-0195
• Persons with probable AD • 50-90 years old • Caregiver will participate	• Clinical trial to assess the safety and effectiveness *bapineuzumab* in AD using infusion	• 20 visits over 18 months that include 6 infusions (once every 13 weeks) • Compensation for travel	Elva Van Hook, RN 317-278-8389 or 866-257-0195
• Persons diagnosed with probable AD • 50 years of age + • Take Donepezil (Aricept®)	• This study will determine whether Dimebon combined with Aricept® improves the symptoms of AD	• 10 visits over 52 weeks • Compensation for time and travel provided	Lyla Christner, LPN 317-274-5029 or Julie Dickson, RN 866-257-0195
• Persons diagnosed with mild AD • 40-85 years of age	• CAD106 or placebo • 4 in 5 chance of receiving active investigational drug	• 52 weeks • 13 study visits at the center	Scott Herring, RN 317-274-9903 or Julie Dickson, RN 866-257-0195
• Healthy older adults • Diagnosed mild to moderate memory difficulties • Spouse or care partner • **Every effort will be made to work around your schedule.**	• Improving care of persons with MCI and their care partners	• 3-month study • Bi-weekly meetings • No cost skills training program • 4 data collection interviews • Compensation for time and free parking provided	Yvonne Lu, RN, PhD 317-278-2042
• Healthy older adults • With mild to moderate memory difficulties. • 60 years of age + • Right-handed • Completed at least the 10th grade of education	• Study of memory in healthy older adults • Study includes a brain scan, blood draw, eye exam and cognitive testing	• 3-year study with 3 assessments 18 months apart • Each visit is 7-8 hours and can be scheduled over 2 days • Compensation for time and effort provided	Tamiko MaGee, MS 317-278-3121 trmagee@iupui.edu

• Persons with probable AD • Age 50-90 years of age	• Study includes Blood draws • Electrocardiograms • Vital Signs memory testing • BMS-708163	• 30 weeks of participation • Study volunteer with caregivers will need to complete 11 study visits	Lyla Christener, LPN 317-274-5029 or 866-257-0195
• African American family caregivers for persons with AD – any stage. • Caregiver (spouse, adult child, other) over 18 years of age who has been primary caregiver for at least 3 months	• Anticipatory grief in African American caregivers	• 1 interview approximately 1 hour long • Interview will be recorded • Complete a written questionnaire • Compensation provided upon completion	Susan McLennon, RN, PhD 352-318-4409 (cell) 317-278-0459 (office) smclenno@iupui.edu
• Qualifying **families** with 2 or more living siblings diagnosed with probable AD • Plus a 3rd family member who is either ≥ 60 yrs and not affected or ≥ 50 yrs with memory problems. • Healthy controls ≥ 60 yrs with no memory problems & no first degree relative with memory problems	• The Genetics of Late Onset Alzheimer's Disease (LOAD) Study	• Longitudinal; over a lifetime or as long as person is willing • Visits include: neurological exam, cognitive evaluation, informant interview and provide a blood sample for DNA at first visit • Follow-up visits every 18 months • Brain only autopsy paid for by study is available but not required to participate	Heather L. Prentice, B.S. 317-274-0561 or 800-526-2839 hlprenti@iupui.edu
• Persons with probable AD • 50 – 85 years of age • Have a caregiver that has contact with patient for more than 1 hour per day at least 4 days per week	• Infusion study of Octagam® 10% also know as an immunoglobulin	• 12 infusions at two-week intervals or 6 infusions at four-week intervals • Study lasts approximately 24 weeks • Compensation provided for each completed visit, each completed lumbar puncture and PET scan	Elaine O'Brien, RN 317-278-8307 or 866-257-0195
• Persons with probable AD • 55 or older	• LY206430 • Study drug or placebo	• Intravenous infusion • 84 weeks • 23 study visits at the center	Scott Herring, RN 317-274-9903 or Julie Dickson 866-257-0195
• Persons probably have AD • 50 or older	• Rivastigmine transdermal patch	• 6 study visits at the center over a 24-week period • Each study visit lasts approximately 1-2 hours	Elaine O'Brien, RN 317-278-8307 or Julie Dickson, RN 866-257-0195

Helping Children Understand Alzheimer Disease

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- Look through photo albums
- Read stories out loud

In the later stages of AD a person may be completely unresponsive. This may be hard for a child to understand. Some children may not talk about their negative feelings, but you may see changes in how they act. Problems at school, with friends, or at home can be signs that they are upset. You may want to ask a school counselor or a social worker to help a child understand that is happening and how to cope.

Teenagers may find it very hard to accept how the person with AD has changed. He or she might find the changes upsetting and may not want to be around the older person. It is a good idea to talk with teenagers about their concerns and feelings. Do not force them to spend time with the person who has AD. This could make things worse.

If the stress of living with someone with AD becomes too great for the child, talk to other family members or friends about helping out and giving you a break. Or consider using respite care options available in your community, and then both you and your child can get a much-needed break and spend some quality time together. These types of issues are at the heart of caring for an older relative while trying to raise your own family. It is important to understand the demands from both sides and accept that it is difficult to meet everyone's needs all the time.

Adapted from NIH newsletter 4/22/2009

Scientists Report Important Step in Biomarker Testing for Alzheimer Disease

Scientists have made an important step forward in developing a test to diagnose the early stages of Alzheimer disease (AD) sooner and more accurately by measuring two biomarkers -- taμ and beta-amyloid proteins -- in cerebrospinal fluid. A recent report from the Alzheimer Disease Neuroimaging Initiative (ADNI) confirmed that certain changes in biomarker levels in cerebrospinal fluid may signal the onset of mild AD and establish a method and standard of testing for these biomarkers. ADNI is a large, multicenter, longitudinal neuroimaging study launched in 2004 by the National Institute on Aging (NIA), the National Institute of Biomedical Imaging and Bioengineering, the Food and Drug Administration, private pharmaceuticals and nonprofit organizations. Locally, Dr. Martin Farlow the director of the Clinical Core at the Indiana Alzheimer Disease Center (IADC) is a member of ADNI, Dr. Andrew Saykin also with the IADC leads the Genetics Core for ADNI and Dr. Eric Siemers from Eli Lilly and Company serves on ADNI's Industry Committee. As you can see, ADNI is a large and collaborative initiative. Leslie Shaw, PhD and John Q. Trojanowski, MD, lead the study that was published in the Annals of Neurology (2009, Volume 65(4) pp 403-413). ADNI researchers are working to find neuroimaging and biomarker tests that can detect AD progression and measure the effectiveness of potential therapies.

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Scientists Report Important Step in Biomarker Testing for Alzheimer Disease

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Richard J. Hodes, MD, Director of NIA said the research indicates that AD pathology causes changes in the brain 10 to 20 years before any symptoms appear. This work gives researchers a systematic and reliable method to measure changes in cerebrospinal fluid biomarkers that may indicate the onset of AD. More research is needed to validate these findings, but this study takes us one step closer to providing researchers and clinicians with tools to detect and understand the very early signs of AD.

The researchers, through comprehensive analysis of earlier studies on cerebrospinal fluid findings were able to confirm and to develop biomarker profiles that may signal the onset of the disease. They also found:

- Levels of beta-amyloid (Aß) protein, in particular Aß1-42, were lower in ADNI volunteers with MCI when compared to those with normal cognition and lower still among those diagnosed with mild AD.

- Levels of Aß1-42 proved to be the most sensitive marker of disease, with an overall test accuracy rate of 87 percent.

- Levels of taμ were higher among ADNI volunteers with MCI than among people with normal cognition, and even higher among volunteers diagnosed with mild AD. Taμ, a protein released by damaged and dying brain cells, forms tangles within cells and may prevent neurons from communicating with each other.

In addition to cerebrospinal fluid markers levels, the researchers also factored in a known genetic risk factor for AD -- APOE-ε4 -- into their analysis. The gene occurs in about 40 percent of all people who develop AD at age 65 or later, but how it increases risk is not yet known. ADNI volunteers with APOE-ε4 genes, high levels of taμ and low levels of amyloid were most likely to have mild AD.

The scientists noted that all 37 ADNI volunteers diagnosed with MCI at the start of the study were documented as having probable AD a year later. That change could be predicted by their cerebrospinal fluid biomarkers. However, 3 ADNI volunteers with MCI at the start of the study, but whose cerebrospinal fluid biomarker levels were similar to volunteers free of the disease, reverted back to normal cognition by the end of the study.

This effort may open the door to the discovery of an entire panel of cerebrospinal fluid biomarkers that will not only predict those at risk of developing AD, but also reveal how the disease is responding to therapies, said Neil Buckholtz PhD, of the NIA Division of Neuroscience. Like all ADNI results these findings have been posted to a publicly accessible database available to qualified researchers worldwide.

Dr. Martin Farlow director of the Clinical Core at the IADC explains: These studies provide the base knowledge needed to facilitate the use of biomarkers to accurately measure disease progression from MCI to AD. Use of the markers in future clinical trials will allow them to be conducted with fewer patients for shorter periods of time, while still accurately determining whether an investigational medication is helpful in MCI or AD patients. Dr. Andrew Saykin, director of the IADC's new Neuroimaging Core, added that We expect that in the not too distant future the combination of structural and molecular neuroimaging, along with CSF markers and genetics, will provide more accurate data on risk for developing AD and facilitate earlier diagnosis and treatment.

This article was adapted from a NIH news release dated March 17, 2009

In Memory….

The Indiana Alzheimer Disease Center Fund gratefully thanks and acknowledges the following individuals for their generous contributions...

January 1, 2009 to present

In Memory of Verna Burns:
Lois E Kaler
Ruth M & Ronald E King

In Memory of Wanda Burton:
Kerry & Karen Brown
Gary L & Jennifer L Hardy
Christina R & Wayne Lunsford

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Mary T & Joseph C Mullikin
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In Memory of Ellen N Johnson's Mother:
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In Memory of Rose Nuzzo:
Anna Anton

In Memory of Hershel H Teufel:
Louis E Teufel

In Memory of Sharon Winston:
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Matthew P Winston CPA PC

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Betty J Lortscher Living Trust
Mary M Poston
James C & Mary E Roesinger

Donations to this fund are a wonderful way to remember or honor a loved one and contributions are 100% tax deductible. Your contributions are gratefully accepted and are used to further research and education in Alzheimer disease in the state of Indiana. **Please make checks payable to:**

Indiana Alzheimer Disease Center Fund
Fund, c/o Indiana University Foundation
P. O Box 660245, Indianapolis, IN 46266-0245

Call (317) 278-8480 for information on making a bequest or planned giving to this fund.

The treasures are in the journey, not only the destination. Enjoy nature's picture show…

Enjoy autumn with some fun activities:

- Take a nature walk
  - -Dress warmly with a jacket, hat and scarf.
  - -Carry a water bottle.
- Enjoy all the beautiful colors of Autumn
- List all the trees in your neighborhood.
- Collect leaves and make a bouquet or place in a basket for an instant centerpiece.
- Visit the art museum, art fairs, town festivals, church bazaars, or
- Just sit on the deck or porch and enjoy the day.

These activities lift the spirits, provide light exercise which can help one relax and sleep better.
Just because your loved one has AD or dementia does not mean their summer activities should be limited as long as there is supervision. If you are concerned with possible problems with wandering please contact the:
Medic Alert® + Safe Return Program at 1.888.572.8566

Is Alzheimer Disease in your family photo?

If there are two or more living members of your family suffering from serious memory loss, our researchers may be interested in your family.

Please contact the National Cell Repository for Alzheimer Disease (NCRAD) to learn more about this research opportunity.

E-mail NCRAD at alzstudy@iupui.edu call 1-800-526-2839.

Reflections is published by the Indiana Alzheimer Disease Center

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