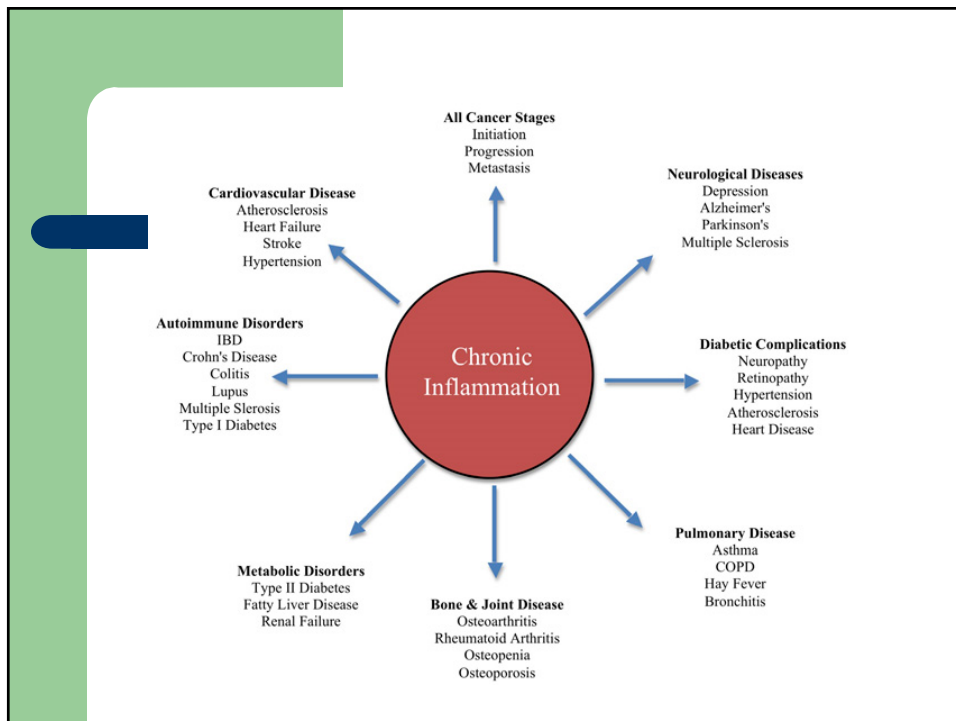


The Anti-Inflammatory Diet: Cooling the “Fires” Within

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The Anti-Inflammatory Diet

- Most people associate **inflammation** with conditions such as arthritis and IBS, but we are increasingly coming to understand that it is also connected to **diabetes, obesity, heart disease, Alzheimer's, cancer and even depression and mood disorders**
- Americans are living more and more disconnected from their natural food sources, and our diets are increasingly made up of **processed foods, excess sugars and bad fats, and genetically modified foods.**

The Anti-Inflammatory Diet

- This is a recipe for **chronic inflammation**.
- An *anti-inflammatory* diet can quiet symptoms, and turn back the tide on many health issues, with the added benefits of **increased energy and, in many cases, weight loss**

What is Inflammation?



- Part of a healthy immune system response
- Low-level, *chronic inflammation* is an excessive, inappropriate inflammatory response
- Can be measured with lab test: *C-reactive protein*
- C-reactive protein (CRP) is a substance produced by the liver in response to inflammation.
- High CRP levels may put people at increased risk for **coronary artery disease**, which can cause a heart attack

The Anti-Inflammatory Diet

- One of the **most powerful tools** to combat inflammation comes **not from the pharmacy, but from the grocery store**
- Many studies have shown that components of foods and beverages can have **anti-inflammatory effects**



Cooking Methods/Inflammation

- Also, HOW we cook our food may be as important as WHAT we cook as far as health and nourishment are concerned
- Food cooked at high heat in our modern, fast-paced, processed-food culture, creates potentially cancer-causing chemicals called ***heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs)***

AGEs, HCAs

- Heterocyclic amines (HCAs) are created when meat, poultry and fish are **cooked at high temperatures** –seafood has less, plant foods little to none
- Foods cooked at high temperature also contain greater levels of advanced glycation end products (AGEs) that cause **more tissue damage and inflammation** than foods cooked at lower temperatures.
- AGEs irritate cells in the body, damaging tissues and increasing risk of complications from diseases like diabetes and heart disease.

HCAAs

- Grilling, barbecuing, broiling and pan-frying are more likely to produce HCAs than baking or roasting – due to high temp
- Propane gas grill can reach 640 degrees F while a typical roasting temp is 350 degrees
- Liquid cooking – boiling, steaming, poaching, stewing generates **no HCAs** because temp never tops boiling point of water.
- Microwave – little HCAs

PAHs

- Polycyclic aromatic hydrocarbons occur whenever fat drips on a flame, heating element or hot coals
- PAHs waft up in the smoke and can land on food
- Can also form directly on food when it's cooked to a crisp

PAHs

- Studies have shown that exposure to HCAs and PAHs can cause cancer in animals
- Many epidemiologic studies of humans have found that high consumption of well-done, fried, or barbecued meats was associated with increased risks of colorectal, pancreatic, and prostate cancer.

Tips to Reduce PAHs, HCAs

- Grill **vegetables** instead of meat!
- **Marinate before** grilling –significantly reduces the amount of HCAs
- **Trim the fat**, remove the skin– less fat drips into flames
- **Partially pre-cook** meats, fish, poultry in oven or microwave before grilling
- Keep meat **portions small** – less time on grill

Tips to Reduce PAHs, HCAs

- **Cover grill** with punctured aluminum foil to avoid letting meat juices drip onto flame
- Keep **water spray bottle** on hand to tame flames
- **Flip frequently**
- **Remove all charred or burnt portions** before eating



What About Cooking Oils?

- Different oils have different uses, and each performs best within a certain **range of temperatures**.
- Every oil has a **smoke point**, the temperature at which it begins to smoke.
- Oil should never be allowed to smoke as it compromises nutritional value and releases carcinogenic free radicals – **promotes inflammation!**



Olive Oil



- As an unrefined oil, extra virgin olive oil should not be exposed to heat higher than 325°F, its smoke point
- Most of its characteristic flavor dissipates under sustained heat
- Extra virgin olive oil is more suitable for use as a condiment than in most cooking applications.

Smoke points of oils

- Avocado 510 degrees F
- Almond 495
- Sesame 445
- Canola 425
- Walnut 400
- Olive 325
- Flax 225



- Resource: <http://www.ebnaturalmedicine.com/wp-content/uploads/2014/06/Spectrum-oil-guide.pdf>

Foods that PROMOTE inflammatory disease

- Foods with **high saturated fat** content, such as animal products and most full-fat dairy products
- Foods with **high omega-6** fatty acid content and low omega-3 fatty acids such as partially hydrogenated oils, margarine, oils from corn, cottonseed, safflower, sesame and sunflower
- Foods with **high glycemic load**, such as bagels, instant rice, white pasta, sugar

Foods that promote inflammatory disease

- For some people - food with **high allergy** potential, such as dairy products, wheat and eggs
- These inflammatory foods can increase production of **inflammatory mediators**
- Foods with high allergy potential may also increase **intestinal permeability**, triggering immune response and potential increase in inflammatory disease

Anti-Inflammatory Foods

- Foods with **high omega-3 fatty acids**, such as cold water fish: salmon, sardines, herring, tuna; flaxseeds, walnuts
- Foods with **high levels of antioxidants**, such as vegetables, citrus fruits, cherries, garlic, onion and tea, cocoa
- **Spices**, in particular, ginger, garlic, rosemary, turmeric, oregano, cayenne, clove and nutmeg
- **Low glycemic index/load foods**
- **Mediterranean Diet** – high in omega 3 fats, F/V, nuts and seeds and whole grains

Recipe: Blueberry Almond Turtles

- Almonds
- Blueberries
- Bittersweet
Dark chocolate



Nuts



- Frequent **consumption of nuts**, has been shown in multiple studies to be **inversely related to inflammatory markers** in the body
- A study published in *The American Journal of Clinical Nutrition* in 2011 found that over a 15-year period, men and women who consumed the most nuts had a **51% lower risk of dying from an inflammatory disease compared with those who ate the fewest nuts.**
- Study published in the journal *Circulation* found that subjects with lower levels of vitamin B6 – found in most nuts – had higher levels of inflammatory markers.

Blueberries



- **Numerous studies show that blueberries can:**
 - ✓ Improve heart health
 - ✓ Reduce cancer risk
 - ✓ Fight UTIs
 - ✓ Improve brain health
 - ✓ Are loaded with antioxidants
 - ✓ Excellent anti-inflammatory food

Cocoa

- Study in the American Journal of Clinical Nutrition found that 40 g of cocoa powder (about 5 Tbsp) per day for a period of 4 weeks reduced inflammatory mediators involved in development of atherosclerosis in subjects at high risk of CVD
- Helps to lower HTN



Recipe: Blueberry Almond Turtles

- Almonds
- Blueberries
- Bittersweet
Dark chocolate



Recipe: Overnight Oatmeal

- Steel cut oats
- Unsweetened almond milk
- Unsweetened apple juice
- Apple
- Brown sugar
- Cinnamon
- Raisins
- Walnuts
- Omega 3 fatty acids from Omega Swirl



Whole Grains

- Every day, more and more studies show the benefits of **whole grains**
- SLOW carbs, not NO carbs!
- Studies show that regular whole grain consumption reduces the **risk of both cardiovascular disease and diabetes**

Whole Grains

- Scientists at the National Institutes of Health, followed 259 healthy women for 2 years, to see if whole grain consumption lowered levels of C-reactive protein.
- They found that women who ate even small amounts of whole grains – up to 1 serving a day – had, on average, 11.5% **lower concentration** of hs-CRP (measures inflammation) in their blood.
- Women eating a full serving or more of whole grain had, on average, 12.3% lower CRP levels.

Omega 3s Fatty Acids

- Omega Swirl



Omega 3 Fatty Acids

- Omega-3 fatty acids are found in fish, such as salmon, tuna, and halibut, other seafoods including algae and krill, flaxseeds and nut oils.
- Also known as polyunsaturated fatty acids (PUFAs), omega-3 fatty acids play a crucial role in brain function
- May reduce the risk of heart disease
- Helps lower high blood pressure
- The American Heart Association (AHA) recommends eating fish (particularly fatty fish such as mackerel, lake trout, herring, sardines, albacore tuna, and salmon) at least 2-3 times a week.

Omega 3 Fatty Acids

- Hundreds of studies suggest that omega-3s may provide benefits to a wide range of diseases: cancer, asthma, depression, cardiovascular disease, ADHD, and autoimmune diseases, such as rheumatoid arthritis.
- All these diseases have a common genesis in inflammation
- Typical dosage is 1,000 – 4,000 mg/day depending on health status and medications

Balanced Omega 6/Omega 3

- EPA and DHA from fish oils are **more biologically potent** than alpha-linolenic acid (ALA) from flaxseeds and walnuts
- A **balanced intake** of omega-6 and omega-3 fatty acids is anti-inflammatory
- Overconsumption of omega-6 fats in relation to omega-3 fats leads to inflammation (common)
- Most appropriate ratio of omega-6 to omega-3 fatty acids is approximately 2:1.

Polyunsaturated Fat

- Omega 6 to Omega 3 should be in a 2:1 ratio
- Typical American diet: more like 20:1 ratio
- We overeat Omega 6 fats and don't get enough Omega 3 fats
- Opposing but complimentary functions in the body
- Omega 6 – pro-inflammatory
- Omega 3 – anti-inflammatory

Omega 6



- Widespread in foods
- Vegetable oils (safflower, sunflower, sesame, corn)
- Salad dressings made with above oils
- Margarines
- Crackers, bread, chips, popcorn, etc
- Increase inflammation in the body
- Reduce intake of Omega 6 fats



Omega 3 Fats



- Increase HDL “good” cholesterol
- Reduce blood clot formation
- Suppresses inflammation in the body
- Decreases triglyceride levels in blood
- Decreases risk/incidence of sudden death and MI
- Inhibits growth of plaque
- Promote arterial relaxation, lowers BP
- Reduce susceptibility to arrhythmias

Sources of Omega 3 fats



- Increase intake of Omega 3 fats
- Choose fatty fish (salmon, sardines, herring, trout)
- Flaxseed and flaxseed oil
- Edamame
- Omega-3 eggs
- Dark leafy greens, wheat germ
- Walnuts and walnut oil, pumpkin seeds



Fish Oil Supplements

- Two omega-3 fatty acids – **eicosapentaenoic acid (EPA)** and **docosahexaenoic acid (DHA)** found to help lower triglycerides, reduce blood clotting and decrease inflammation
- AHA: **healthy people should get about 1,000 mg** per day of EPA and DHA
- **High Blood pressure: 2,000 mg** per day
- **High triglycerides: 2-4 grams per day** (under care of health care provider)
- Fish oil supplements – quality matters
- Omacor/Lovaza/Vascepa – prescription fish oils

Fish Oil Supplements

- Over the counter brands:
- Nordic Naturals
- Carlson



Cinnamon

- Cinnamon has a long history both as a spice and as a **medicine**.
- Seasoning a high carb food with cinnamon can help **lessen its impact on your blood sugar levels**.
- Cinnamon **slows** the rate at which the stomach empties after meals, reducing the rise in blood sugar after eating (Ceylon cinnamon is best)
- Adding cinnamon to the rice pudding lowered the gastric emptying rate from 37% to 34.5% and significantly lessened the rise in blood sugar levels after eating. Am J Clin Nutr. 2 007 Jun;85(6):1552-6.

Recipe: Overnight Oatmeal

- Steel cut oats
- Unsweetened almond milk
- Unsweetened apple juice
- Apple
- Brown sugar
- Cinnamon
- Raisins
- Walnuts
- Omega 3 fatty acids from Omega Swirl



Recipe: Pumpkin Black Bean Soup

- Black beans
- Tomatoes
- Chicken broth
- Onion and garlic
- Pumpkin
- Black bean burgers
- Tea seed oil



Black beans

- The "**protein-plus-fiber**" combination in black beans and other legumes is key to their outstanding support for blood sugar balance and blood sugar regulation
- Numerous studies show **decreased risk of type 2 diabetes** following increased intake of fiber from plant foods (and especially legumes)

Black beans



- Much of the research on bean intake and decreased risk of cardiovascular disease focus on the **outstanding soluble fiber content of beans.**
- One cup of black beans provides over 4 grams of soluble fiber, and this is precisely the type of fiber that researchers have found **especially helpful in lower blood cholesterol levels.**
- Decreased risk of coronary heart disease (CHD) and myocardial infarct (MI, or heart attack) have both been associated with increased intake of soluble fiber from food, especially beans

Anti-Inflammatory Fruit/Vegetables

- A high fruit and vegetable intake has been shown to be associated with a **low level of inflammation**
- Fruit and vegetable intake has been shown to be **inversely related to oxidative stress and inflammation in type 2 diabetics**
- Consuming a diet high in fruits and vegetables is associated with lower risks for numerous chronic diseases, including cancer and cardiovascular disease.
- Tomatoes, onions, garlic, pumpkin



Pumpkin

- A 2010 article published in "*Nutrition Research Reviews*" notes that pumpkin **reduces inflammation**
- Alpha- and beta-carotene antioxidants are a class of carotenoids that convert into usable vitamin A within the body.
- Beta-carotene is **anti-inflammatory**
- Alpha-carotene hinders tumor growth, slows aging and protects against cataracts.
- Additionally, **carotenoids reduce the risk of cardiovascular disease and boost immunity.**



Recipe: Pumpkin Black Bean Soup

- Black beans
- Tomatoes
- Chicken broth
- Onion and garlic
- Pumpkin
- Black bean burgers
- Tea seed oil



Recipe: Spicy Cherry Salsa

- Cherries and cherry juice
- Cider vinegar
- Garlic
- Agave
- Ginger, allspice, cayenne, cardamom, cinnamon



Cherries



- Scientific studies show that **cherries** are packed with unique *anthocyanins* and other compounds that **naturally mediate the inflammatory process**
- These compounds deliver comparable anti-inflammatory activity to *ibuprofen* (Advil®) and *naproxen* (Aleve®)⁷—*but without the significant side effects!*
- The compounds found in cherries modulate numerous pathways to protect against other conditions associated with **inflammation**—including cancer, cardiovascular disease, metabolic syndrome, and Alzheimer’s disease.

Cherries



- **Tart cherry** constituents can switch critical genes off and on
- Tart cherries were ranked 14th among the top 50 foods for highest **antioxidant** content per serving—surpassing such well-known antioxidant sources as red wine and dark chocolate, according to the *American Journal of Clinical Nutrition*

Guard Against Degenerative Disease and Inflammation with Tart Cherries

- Physical exercise can induce **muscle damage** that generates inflammation and with it, burning, stiffness, and pain. The effect **worsens with age**.
- Standard treatment with nonsteroidal anti-inflammatory drugs such as *Ibuprofen* (Advil®) involves **potentially deadly adverse effects, such as stroke**.
- Evidence shows that the complex anthocyanins and phenols in **tart cherries** provides superior protection against muscle injury—by safely inhibiting the pain and inflammatory effects.

Tart Cherries



- The potent components in tart cherries have been demonstrated to deliver high-level protection against inflammatory and degenerative diseases, including **cardiovascular disease, metabolic syndrome, and neurodegenerative diseases such as Alzheimer's.**

Tart Cherries

- A study conducted by scientists at Boston University found that intake of cherry extract reduced the risk of gout attacks in those who suffered recurrent gout attacks by **45%**
- Additionally, the researchers discovered that when cherry intake was combined with allopurinol use, the risk for gout attacks was reduced by **75%** versus no intervention.
- What's more, these results persisted even across subgroups stratified for sex, obesity status, purine intake, and alcohol use
- Tart cherries appear to be a natural—and safe—way to inhibit the key gout pathway.

Sweet Cherries



- An impressive study released in 2013 reported that after 28 days of consumption, **sweet** cherries were found to selectively and significantly reduce a number of biomarkers associated with inflammatory diseases.
- Among other decreased inflammation indicators, blood levels of **C-reactive protein were reduced by over 20%**

Garlic



- Garlic has been used as a medicinal plant since ancient times
- Researchers have shown that garlic may promote an anti-inflammatory environment by cytokine modulation that leads to overall inhibition of NF-(kappa)B activity
- NF-(kappa)B is a central transcription factor in adaptive immunity and a **central regulator of pro-inflammatory gene expression**

Ginger



- Ginger contains very **potent anti-inflammatory** compounds called *gingerols*.
- These substances are believed to explain why so many people with osteoarthritis or rheumatoid arthritis experience **reductions in their pain** levels and improvements in their mobility when they consume ginger regularly.
- In two clinical studies involving patients who responded to conventional drugs and those who didn't, physicians found that 75% of arthritis patients and 100% of patients with muscular discomfort experienced relief of pain and/or swelling.

Spices: Ginger



- Ginger belongs to the same botanical family as turmeric and cardamon
- Has been used as an anti-inflammatory agent for centuries
- Researchers have found that ginger inhibits prostaglandin biosynthesis – similar to NSAIDs

Spices: Ginger



- Ginger extract also inhibits the induction of several genes involved in the inflammatory response
- *In a study of 261 people with osteoarthritis (OA) of the knee, those who received a ginger extract twice daily experienced less pain and required fewer pain-killing medications compared to those who received placebo.*
- For analgesic purposes, 2 to 4 grams fresh ginger juice or extract taken daily is recommended

Zyflamend



- Food- and herb-based supplement that combines ten of the very top anti-inflammatory concentrates
- One of the top herbal supplements sold in the world
- **Rosemary, Turmeric, Ginger, Holy Basil, Green Tea, Hu Zhang, Chinese Goldthread, Barberry, Oregano, Baikal Skullcap**

Cayenne



- Arthritis is generally thought to be an inflammatory disorder resulting in destruction of the tissues lining the joints.
- Cayenne pepper has been used topically to increase blood supply and provide a warming sensation to affected joints.
- Taken internally as a supplement, cayenne may also help to reduce joint inflammation through its antioxidant activity.
- Applied as a topical cream, gel or patch, capsaicin works by **depleting the amount of a neurotransmitter called substance P that sends pain messages to the brain.**

Capsaicin

- Many studies have shown that capsaicin effectively **reduces pain from osteoarthritis, rheumatoid arthritis and fibromyalgia.**
- In a 2010 German study, joint pain decreased nearly 50% after three weeks' use of 0.05 percent capsaicin cream.

Recipe: Spicy Cherry Salsa

- Cherries and cherry juice
- Cider vinegar
- Garlic
- Agave
- Ginger, allspice, cayenne, cardamom, cinnamon



Recipe: Apricot Chicken Tagine

- Canola oil
- Chicken
- Onion, garlic, ginger
- Turmeric
- Nutmeg
- Cinnamon
- Saffron
- Vegetable broth
- Apricots
- Garbanzo beans
- Tomatoes
- Cashews
- Cilantro



Spices: Turmeric

- Curcumin is a naturally occurring chemical compound that is found in the spice turmeric
- Turmeric is a mustard-yellow spice from Asia.
- Main ingredient in curry
- Laboratory and animal research has **demonstrated anti-inflammatory, antioxidant, and anti-cancer properties of turmeric** and its constituent **curcumin**.



Spices: Turmeric



- Researchers tested turmeric extracts in animal models and found evidence of anti-arthritic and anti-Alzheimer's disease efficacy
- They found that curcuminoid extract inhibits a transcription factor, NF-KB, from being activated in the joint
- Typical dose used therapeutically 400 mg twice a day

Turmeric



- One of the most comprehensive summaries of turmeric benefits studies to date was published by the respected ethnobotanist James A. Duke, Phd., in the October, 2007 issue of *Alternative & Complementary Therapies*, and summarized in the July, 2008, issue of the *American Botanical Council* publication *HerbClip*.
- Reviewing some 700 studies, Duke concluded that **turmeric appears to outperform many pharmaceuticals in its effects against several chronic, debilitating diseases, and does so with virtually no adverse side effects.**

Turmeric

- **Alzheimer's disease:** Duke found more than 50 studies on turmeric's effects in addressing Alzheimer's disease.
- The reports indicate that extracts of turmeric contain a number of natural agents that **block the formation of beta-amyloid, the substance responsible for the plaques that slowly obstruct cerebral function in Alzheimer's disease.**
- Dosages of 400 to 600 mg, taken three times daily have been used in studies

Turmeric

- **Arthritis:** Turmeric contains **more than two dozen anti-inflammatory compounds**, including six different COX-2-inhibitors (the COX-2 enzyme promotes pain, swelling and inflammation; inhibitors selectively block that enzyme).
- By itself, writes Duke, curcumin - the component in turmeric most often cited for its healthful effects - is a multifaceted **anti-inflammatory agent**, and studies of the efficacy of curcumin have demonstrated positive changes in arthritic symptoms.

Salicylic Acid



- Salicylic acid is the active component of willow-bark, long used as a folk remedy for pain
- **Aspirin** is a synthetic derivative of willow bark
- Foods high in salicylic acid: **berries, grapes, broccoli, spinach, chili peppers, cinnamon, ginger, rosemary, nutmeg, sage, basil, strawberries**

Mediterranean Diet



- Studies have found that the Mediterranean diet can produce beneficial changes on markers of inflammation, including **reduction in C-reactive protein and pro-inflammatory cytokines**, as well as reduced platelet aggregation and improved endothelial function

Mediterranean Diet



- High cardiovascular risk participants from the PREDIMED trial eating a Mediterranean diet, rich in olive oil and nuts, showed improved lipid profiles, decreased insulin resistance and **reduced concentrations of inflammatory molecules** compared with those allocated to a low-fat diet

Tagine



- **Definition:** A tagine is like a casserole dish used in north African cooking, most commonly in Morocco.
- It consists of two pieces - a plate like bottom and a conical shaped lid. The bottom doubles as a serving dish.
- Can purchase in cooking stores or online.

Recipe: Apricot Chicken Tagine

- Canola oil
- Chicken
- Onion, garlic, ginger
- Turmeric
- Nutmeg
- Cinnamon
- Saffron
- Vegetable broth
- Apricots
- Garbanzo beans
- Tomatoes
- Cashews
- Cilantro



Anti-Inflammatory Diet

- 90% **plant-based** foods (or more)
- **Fresh produce** at every meal – Fruits and veggies
- **No processed foods** (made in a factory)
- **No fried foods, no cheap oils**
- **Good fats:** extra virgin olive, walnuts, and omega 3 fats in fatty fish like salmon, sardines, herring and tuna
- **Lots of avocados, fresh tomatoes, cucumbers, herbs and spices, etc.**
- **Low glycemic** foods like berries, and legumes
- **Green tea and water** as your beverages

Cook well, live long . . .



*Richard Collins, MD and
Susan Buckley, RDN, CDE*