That Chemi Reaction Cal Lo

WHEN I WAS 17, as part of a project for my Humanities class, I wrote to my grandfather, asking about my Scottish ancestry. His typed response arrived promptly — two pages of *genealogy* and four-and-a-half pages of how he had met and fallen in love with my grandmother more than a half-century before. While most of his reply had little to do with my project, it is a love letter that resonates with me to this day.

Genealogy — A family tree; a table representing the descent of a person, family, or group from an ancestor or ancestors

Relocating Love

Yet, in recent years, scientific research appears to have put a damper on romantic love as we have always perceived it — the kind of love heralded by poets and songwriters. It seems it is the brain — and not the heart — that helps create the giddy way we feel when we come across that special someone.

Anthropologist Helen Fisher, author of *Why We Love: The Nature and Chemistry of Romantic Love*, decided to study romantic love because it "is one of the most powerfully motivating forces on earth." She recruited 10 women and seven men who claimed to be newly and wildly in love, putting each into a brain scanner while showing them two photographs — one of their beloved and the other of someone familiar but neutral from an emotional standpoint. Consider this:

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by Mary Ann McGann

Metabolically — Resulting from the complex of physical and chemical processes occurring within a living cell or organism that are necessary for the maintenance of life

Before showing a subject the neutral photograph, Fisher had the person count backward from an extremely high number, like 8,421, in increments of seven, in order to "cleanse the brain of all romantic feelings" that may have been lingering from eyeing their sweetheart's picture. Yikes!

Fisher and her colleagues, Lucy Brown and Arthur Aron, found that when a subject looked at the photograph of his or her loved one, there was increased activity in two areas of the brain, the ventral tegmental area and the caudate nucleus, both associated with focused attention and the motivation to win a reward. In fact, the caudate nucleus contains millions of receptors for a neurotransmitter called dopamine, a powerful stimulant that Fisher says is central to the feeling of romantic love. That feeling includes elation, hope, and the intense urge to win the affections of another person.

"Romantic love is extremely *metabolically* expensive," says Fisher. "You're not eating right, not sleeping right, not getting to work or school on time."

Fisher also has been studying what happens to the brain when someone is rejected in love. What she has found is increased activity in areas associated with physical pain, with high-risk chance-taking, with obsessive-compulsive behavior, and with controlling anger.

"So you can see why these people become so incredibly troubled," says Fisher.

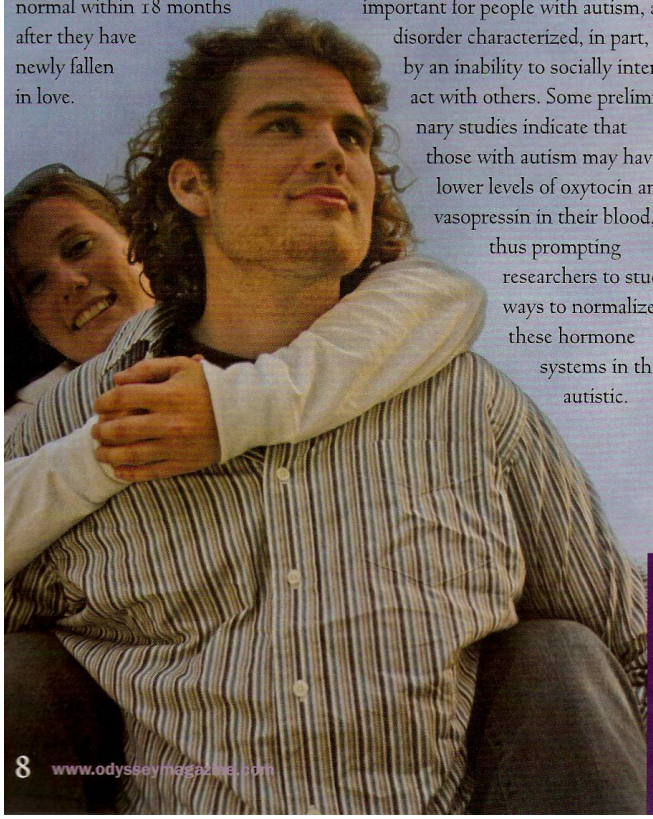
A decade ago, Donatella Marazziti, a professor of psychiatry at the University of Pisa in Italy, hypothesized that romantic love was akin in some ways to obsessive-compulsive disorder, or OCD. After all, how often have we heard the terms "madly in love" or "lovesick"?

Marazziti took blood samples from 20 persons who had fallen in love within the previous six months, 20 unmedicated OCD patients, and 20 people who were neither in love nor suffering from mental illness. She measured the levels of serotonin, a key neurotransmitter that, when in short supply in the brain, is believed to

intensify the symptoms of OCD and certain depressive illnesses.

"I found that romantic lovers in the early phase of a relationship had a decreased function of the serotonin system, as reflected by the lower number of the serotonin transporter in platelets, and that they were similar, in this respect, to patients suffering from obsessive-compulsive disorder," says Marazziti.

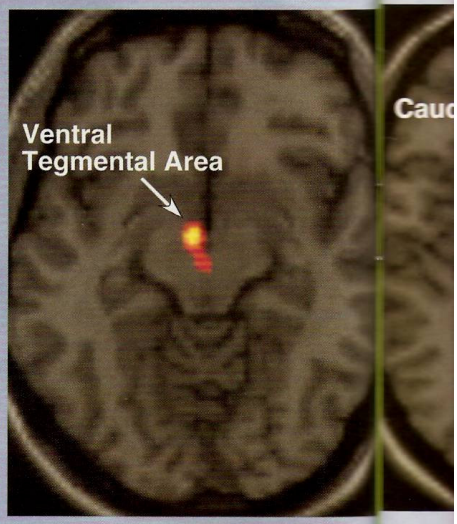
Okay, so all this helps explain why we might fall head over heels in love. However, fortunately — or unfortunately, depending on your point of view — no human can sustain the level of euphoria that early romantic love demands. In fact, Marazziti found that the levels of serotonin in most couples return to normal within 18 months after they have newly fallen in love.



When Love Settles In

So, once the glitter and glow wears off, what makes us stay in that relationship? For that, we turn to a handful of studies on the mating habits of some micelike animals known as prairie voles. According to the Society for Neuroscience, researchers found that supplements of the brain hormones oxytocin and vasopressin — which are believed to create connectedness and bonding — increase a vole's sociability as well as its preference for monogamy. (Monogamy is staying with one mate for a lifetime.) When the activity of the oxytocin or vasopressin was blocked, social contact among the voles was low.

These findings could prove important for people with autism, a disorder characterized, in part, by an inability to socially interact with others. Some preliminary studies indicate that those with autism may have lower levels of oxytocin and vasopressin in their blood, thus prompting researchers to study ways to normalize these hormone systems in the autistic.

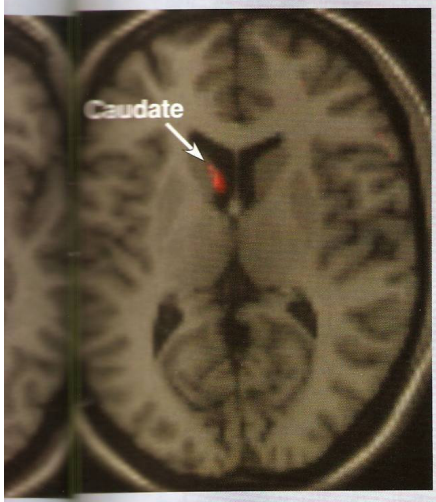


But Whom Should We Love?

There are those who believe that, in our choice of a certain person to love, we are hoping to reclaim the past — recapturing the earliest of memories embedded in our brains of maternal love and uncomplicated childhoods.

Yet others believe that we choose a mate for reasons of survival of the species. For example, a man might pick a woman for her health and potential childbearing abilities, and a woman could select her mate for his strong immune system. This is called the "mating instinct" theory and could help explain some interesting research conducted in Switzerland.

Claus Wedekind of the University of Lausanne asked 44 male



If you looked inside the brains of the young couple pictured opposite, they would be lit up in two areas just like the brain at center. The caudate and ventral tegmental areas of the brain contain millions of receptors for the neurotransmitter dopamine, which is central to the elated feeling of romantic love. But what makes that love endure for couples like the one pictured below? Some scientists think it's a good supply of the brain chemicals oxytocin and vasopressin. The scientists would likely agree that lots of hard work, plus a bit of kindness and understanding, help, too.

students to each wear a T-shirt of 100 percent untreated cotton for two nights in a row while, at the same time, avoiding odor-producing foods, deodorants, soaps, tobacco, and other smelly stuff. The following day, a group of women was asked to sniff each T-shirt and rate it in terms of intensity and pleasantness.

"We found that body odors and body odor preferences are linked to certain aspects of our genetics and our immune function," reports Wedekind.

It turns out that each female preferred the sweaty shirt of a male with a different MHC type than her own. MHC, or major histocompatibility complex, is a group of genes that enables our immune system to detect infections.

Helen Fisher believes that there are many forces that play a role in determining whom we fall in love with: timing and proximity; social, religious, educational, and economic backgrounds; physical attractiveness; values and interests. By the teenage years, she says, "each of us has constructed an unconscious catalog of aptitudes and mannerisms we are looking for in a mate. Then, when we meet someone who fits within this 'love map' and they begin to flirt, the interaction may trigger the brain chemistry of romance and we fall head over heels in love."

Or, in the lyrics of a love song from your grandparents' day, before scientists knew that love was chemical:

"When the stars make you drool
just like a pasta fagiole,
that's *amore*.
When you dance down the street
with a cloud at your feet,
you're in love.
When you walk in a dream,
but you know you're not dreaming,
signore.
Scuzza me,
but you see,
back in old Napoli,
that's amore." ☺

Mary Ann McGann is a former CNN reporter and producer. This is her first article for *ODYSSEY*.

Amore **— The word for "love" in Italian**

E US!

Do songwriters of today capture the excitement of falling in love in their lyrics? Send in three or four lines from the song that you think does it best to ***ODYSSEY*, 30 Grove St., Suite C, Peterborough, NH 03458** along with the recording artist's name. Or email them to **odyssey@cobblestone.mv.com**. Include your full name, age, and contact information. We'll publish some of your choices in a future issue.