Now, your nerves need a little help carrying those messages. When a message gets to the end of one nerve, the next nerve isn't right there, ready to grab the message and boot it along. Instead, there's a space between nerves called a "synapse" and something has to help the messages get across. That "something" is a group of chemicals called neurotransmitters. Neurotransmitters receive the messages as they hit the end of each nerve and carry them across to the next nerve.

(This is where Mentally Tough comes in.)

Neurotransmitters also help carry messages of emotion. When you are frightened, for example, a neurotransmitter called epinephrine is present in your limbic system in large amounts. That means that messages passing through the limbic system are carried from nerve to nerve by epinephrine. When those messages reach your muscles, they make your heart beat faster, make your lungs pump faster, and make your muscles carry you quickly to the curb.

There are many different neurotransmitters, and each one carries messages of one kind of emotion. Four of these neurotransmitters are particularly important to being Mentally Tough:

**EPINEPHRINE** (pronounced ĕ-pin-ĕ´-frin) carries messages of fear. It makes your heart beat faster, makes you breathe faster, sends energy to your muscles, and makes you alert. These responses help you run away from — or fight — the thing that frightened you. Epinephrine is also known as **adrenaline.**

**NOREPINEPHRINE** (pronounced nor´-ĕ-pin-ĕ-frin) carries messages of anger and tension. It also makes your heart beat faster, makes you breathe faster, sends energy to your muscles, and makes you alert.

**SEROTONIN** (pronounced ser-ŭ-to´-nin) is a neurotransmitter that carries messages of pleasure and relaxation and reduces your sense of pain.

**ENDORPHINS** (pronounced en-dor´-fins) are neurotransmitters that work in reverse. Instead of carrying messages from one nerve to the next, they stop messages from traveling on. The ones they *stop* are messages of pain. At the same time, they stimulate feelings of pleasure.

## SO WHAT DO ALL THESE NEUROTRANSMITTERS HAVE TO DO WITH BEING MENTALLY TOUGH?

A lot, because neurotransmitters directly affect the way you perform.

Take norepinephrine, for example. It makes you feel alert. Well, you certainly want to feel alert when it's time to perform. (You wouldn't want to face a problem feeling drowsy, would you?) That means that when it's time to perform, you want a lot of norepinephrine in your system.

But not *too* much norepinephrine — because too much norepinephrine will make you over-alert. It will make you nervous, edgy and angry. That's the definition of High Negative, and you certainly don't want to be *there* when it's time to solve a problem.

Or take serotonin. Serotonin makes you feel happy and relaxed. Those are important aspects of High Positive — just what you want when it's time for a challenge. Before hand, you'd want a lot of serotonin in your system.

But not *too much* serotonin — because too much serotonin will make you over-relaxed — ready to fall asleep. That's not the way to solve a problem, either.

Or take endorphins. They block pain and stimulate feelings of pleasure. Before tackling a problem you'd want endorphins in your system to help you relax and feel confident. But — you guessed it — not too many endorphins, because with

## NEUROTRANSMITTER PERFORMANCE CHART

| NEUROTRANSMITTER | How you feel if you have... | | |
|---|---|---|---|
| | TOO LITTLE | JUST RIGHT | TOO MUCH |
| **NOREPINEPHRINE** | SLUGGISH, LOW ENERGY | ENERGIZED | ANGRY,TENSE, JITTERY |
| **EPINEPHRINE** | SLUGGISH | ENERGIZED | NERVOUS, FEARFUL, SHORT BREATHS |
| **SEROTONIN** | NERVOUS ENERGY | RELAXED | SLEEPY |
| **ENDORPHINS** | NEUTRAL | RELAXED, HAPPY | TOO MELLOW TO CONCENTRATE, GIDDY |

too many endorphins you get giddy. You'll be so relaxed you won't be able to think clearly, and obviously that's no ticket to success.

So in order to be in High Positive — in order for you to perform at your best — you need to have just the right amount of each of these neurotransmitters in your system. Too much (or too little), and you'll be in one of the other energy states.

Fortunately, getting just the right amount of each neurotransmitter isn't all that hard. That's exactly what the five Mentally Tough tools do.

### *The Difference Between Men and Women*

**In times of tension our nervous systems manufacture epinephrine and norepinephrine. But women make more epinephrine and men make more norepinephrine. The result is that women tend to become anxious when they're tense and men tend to become angry.**

# NEUROTRANSMITTERS IN ACTION

**1. If I wanted to fall asleep at night, I"d want to have a lot of_____ in my nervous system.**

**a.** epinephrine **b.** norepinephrine **c.** serotonin **d.** endorphins

**2. If I felt sluggish or sleepy today, I might have had too much_____ and too little_____ in my system.**

**a.** epinephrine **b.** norepinephrine **c.** serotonin **d.** endorphins

**3. I was so tense I yelled at my sister over something petty. I might have had too much_____ in my system.**

**a.** epinephrine **b.** norepinephrine **c.** serotonin **d.** endorphins

**4. It was a tough game. We lost big. But I played hard and really enjoyed myself. I must have had the right amount of_____ in my system.**

**a.** epinephrine **b.** norepinephrine **c.** serotonin **d.** endorphins

**5. If you were feeling low energy right before a big event, you'd want to raise the level of_____ in your system to give yourself an energy boost.**

**a.** epinephrine **b.** norepinephrine **c.** serotonin **d.** endorphins

**6. If you were nervous about giving a speech to a large audience, you would want more_____ in your system.**

**a.** epinephrine **b.** norepinephrine **c.** serotonin **d.** endorphins

**6. (c) serotonin**
**5. (b) norepinephrine**
**4. (d) endorphins**
**3. (b) norepinephrine**
**2. (c) serotonin**