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Gender differences in plasma leptin concentrations

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sults suggest that there is an association between BDV and psychiatric disorders all over Japan, but that BDV is not associated with the habit of eating raw horse meat.

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1. Bode, L., Zimmermann, W., Ferszt, R. Steinbach, F. & Ludwig, H. Borna disease virus genome transcribed and expressed in psychiatric patients. *Nature Med.* **1**, 232–236 (1995).
2. Kishi, M. *et al.* Demonstration of human Borna disease virus RNA in human peripheral blood mononuclear cells. *FEBS Lett.* **364**, 293–297 (1995).
3. Kishi, M. *et al.* Prevalence of Borna disease virus RNA in peripheral blood mononuclear cells from blood donors. *Med. Microbiol. Immunol.* **184**, 135–138 (1995).
4. Sierra-honigmann, A.M., Carbone, K.M. & Yolken, R.H. Polymerase chain reaction (PCR) search for viral nucleic acid sequences in schizophrenia. *Br. J. Psychiatry* **166**, 55–60 (1995).
5. Nakamura, Y. *et al.* Demonstration of Borna disease virus RNA in peripheral blood mononuclear cells from healthy horses in Japan. *Vaccine* **13** (12), 1076–1079 (1995).
6. Cubitt, B., Oldstone, M. & de la Torre, J. Sequence and genome organization of Borna disease virus. *J. Virol.* **68**, 1382–1396 (1994).
7. Bode, L. *et al.* Human infections with Borna disease virus: Seroprevalence in patients with chronic diseases and healthy individuals. *J. Med. Virol.* **36**(4), 309–315 (1992).

More appropriate terms for the genetically predisposed

To the editor — Although they describe a very important phenomenon, Jonsen *et al.* (*Nature Medicine* **2**, 622–624; 1996) do a disservice to medicine by inventing and introducing the inappropriate, indefinite, senseless expression, "unpatient." Published in an influential magazine, neologisms tend to stick. There is still time to find a better name.

Every dictionary of synonyms supplies a multitude of words that are more to the point. The adjectives *doomed* or *fated* are too ominous, but future patient, predestined patient, presymptomatic patient or just prepatient, maybe preceded with genetic — genetic prepatient — express more accurately what is meant.

In science there are many terms used thoughtlessly and mechanically which are grammatically incorrect (recombinant instead of recombinated, for assembled genes), or imprecise (adrenal instead of suprarenal), or later shown to be wrong [atom (indivisible) for a thing composed of nucleus and electrons]. Editors have the responsibility not only to urge correctness of facts but also precision of the terms used.

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Gender differences in plasma leptin concentrations

To the editor — Plasma levels of leptin, the adipocyte-specific product of the *ob* gene implicated in body weight regulation, are well correlated with body fat content in human subjects and decrease with weight loss in both obese[1–3] and normal weight subjects[3]. Women have increased *ob* gene expression[4] and higher plasma leptin concentrations[1,2] than men, an effect previously attributed to relatively greater body fat content in women[1,2] or reproductive hormones[4]. To investigate whether plasma leptin remains elevated in women after correcting for adiposity, we compared plasma leptin concentrations in 13 normal weight, premenopausal women and 11 age-matched men. To determine whether endogenous reproductive hormones (estrogen and progesterone) contribute to this effect, we compared values from the premenopausal women with those from nine untreated postmenopausal women (without menses for >1 year, status post bilateral ovariectomy, or follicle-stimulating hormone (FSH) >50 mIU/ml). To determine the effects of exogenous sex steroid hormones, we compared plasma leptin in the untreated postmenopausal women with values measured in ten normal weight postmenopausal women receiving hormone replacement (HR) (estrogen, 0.625–1.2 mg/day; or estrogen/progesterone, 0.625–1.2 mg/day and 2.5–10 mg/day, respectively). These comparisons are summarized in the Table.

Plasma leptin was 4 times higher in normal weight premenopausal women than in men of comparable age. This difference persisted after correcting for percent body fat or total body fat. Absolute and adiposity-corrected plasma leptin levels in women were independent of age, reproductive status, and hormone replacement. Similar results were observed in 11 untreated and eight hormone-treated postmenopausal overweight women (body mass index (BMI) = 35.1 ± 1.2 kg/m^2). Absolute levels were higher than in normal

Table Absolute and adiposity-corrected plasma leptin in men and women

	Men	Women		
		Premenopause	Postmenopause – HR	Postmenopause + HR
(n)	(11)	(13)	(9)	(10)
Age (yr)	34 ± 2	30 ± 2	60 ± 3	60 ± 2
BMI (kg/m^2)	24.7 ± 0.5	23.2 ± 0.4	24.5 ± 0.6	24.0 ± 0.5
Body fat (BF) (%)	17.0 ± 1.1*	27.2 ± 1.1	28.5 ± 1.2	28.1 ± 1.7
Total BF (kg)	12.7 ± 0.9*	17.7 ± 1.0	18.3 ± 1.2	18.4 ± 1.5
[Leptin] (ng/ml)	3.5 ± 0.3*	14.9 ± 1.9	16.3 ± 3.3	17.0 ± 1.9
[Leptin]/BMI	0.14 ± 0.01*	0.64 ± 0.07	0.65 ± 0.13	0.69 ± 0.08
[Leptin]/BF (%)	0.21 ± 0.02*	0.54 ± 0.05	0.56 ± 0.10	0.59 ± 0.06
[Leptin/BF (kg)	0.28 ± 0.02*	0.82 ± 0.08	0.86 ± 0.14	0.92 ± 0.10

*$P < 0.001$ vs. women. BMI, body mass index.

weight women; however, neither absolute nor adiposity-corrected plasma leptin concentrations were different for untreated overweight postmenopausal women (36.3 ± 1.7 ng/ml, 1.03 ± 0.10 ng/ml per kg) and overweight postmenopausal women with hormone replacement (40.8 ± 4.1 ng/ml, 1.20 ± 0.08 ng/ml per kg). Thus, both absolute and adiposity-corrected plasma leptin levels are unaffected by hormone replacement in either normal weight or overweight postmenopausal women. Therefore, gender differences in plasma leptin concentrations are unlikely to be explained by either increased adiposity or by reproductive hormone status. Differences in body fat distribution between men and women could contribute to the sexual dimorphism, because *ob* gene expression varies between fat depots[5]. Moreover, cerebrospinal fluid leptin levels are higher in women than in men, even after correcting for the higher plasma levels[6], which suggests enhanced transport of leptin into the CNS in women. These data suggest that women require increased leptin production and delivery to the brain for normal body weight regulation. Unraveling the mechanisms underlying these gender differences may have important physiologic and pharmacologic ramifications.

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1. Maffei, M. *et al.* Leptin levels in human and rodent: Measurement of plasma leptin and *ob* RNA in obese and weight-reduced subjects. *Nature Med.* **1**, 1155–1161 (1995).
2. Considine, R.V. *et al.* Serum immunoreactive-leptin concentrations in normal-weight and obese humans. *N. Engl. J. Med.* **334**, 292–295 (1996).
3. Havel, P.J., Kasim-Karakas, S., Mueller, W., Johnson, P.R. & Stern, J.S. Plasma leptin (Ob protein) decreases with adiposity but not dietary fat content and correlates with plasma insulin levels in obese and lean women. *Diabetes* **45** (suppl. 1), 41A (Abstr. 143) (1996).
4. Lonnqvist, F. The obese gene (*ob*) and human obesity. *News Physiol. Sci.* **11**, 147–148 (1996).
5. Masuzaki, H. *et al.* Human obese gene expression: Adipocyte-specific expression and regional differences in the adipose tissue. *Diabetes* **44**, 855–858 (1995).
6. Schwartz, M.W. *et al.* Cerebrospinal fluid leptin levels: Relationship to plasma levels and to adiposity in humans. *Nature Med.* **2**, 589–593 (1996).

Gaucher's treatment: First things first

To the editor — In a News & Views article, Dr. Beutler criticizes an NIH Technology Assessment Panel for providing no solution to the huge costs of treatment of Gaucher patients by enzyme replacement therapy[1]. As an audience participant at this conference and researcher in the field of recombinant protein production, I would like to offer a more positive perspective.

That a therapy providing dramatic improvements in patients' health and quality of life has been developed is a tremendous achievement. Quoting from the summary statement, this important success is indeed "a credit to the investigators, the National Institutes of Health, the pharmaceutical manufacturer, and the many patients and their families" who all participated in the development of this therapy[2]. Genzyme Corporation took significant financial risks in providing the native and recombinant enzymes (modified glycoforms) and continues to invest in new forms of transgenic recombinant protein production systems as well as gene therapy approaches to treatment. Also, it should be remembered that the NIH panel that Beutler comments on was not charged with the resolution of the cost issue. Nor could it be expected to.

This problem has now attracted new researchers who will focus on lowering the costs of treatment through a combination of novel transgenic production methods and improvements in bioprocessing. For example, at least two groups are working toward harnessing the economies of scale of agriculture for this purpose. Thus far the results are very encouraging. It is therefore hoped that one solution is simply to lower the costs of therapy with future research and development in pharmaceutical production technology.

I prefer not to underestimate the wealth of our society nor the capacity of its individual members to have compassion for their fellow man. The confidence I have in economics is based on the value of new ideas, not theories of scarcity and limitations.

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Neither the author nor Biosource Technologies has any relationship with Genzyme corporation.

1. Beutler, E. The cost of treating Gaucher disease. *Nature Med.* **2**, 523–524 (1996).
2. Gaucher disease: Current issues in diagnosis and treatment. *Natl. Inst. Health Technol. Assess. Statement*, Feb. 1–March 1 (1995).