aborted fetal tissue and embryos originally created for fertility treatment (77 and 59%, respectively); however, 73% of respondents viewed creation of human embryos for research purposes as ethically unacceptable.

Thus, although the respondents are generally opposed to the creation of embryos for research, most appear to view the potential medical benefits as such that we should take advantage of the existence of unused embryos that would ultimately be discarded.

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1. The survey was part of a study sponsored by the Richard Lounsbery Foundation. A 12-page survey was sent to 3632 U.S. members of the American Society of Human Genetics, and 1236 surveys were returned, 1229 of which met all eligibility criteria. A copy of the group of questions from the survey relevant to this discussion are available from June Goldner, research consultant for the survey, at goldner@bestweb.net

Parasitic Plants Major Problem to Food Crops

IN THE PLANT PATHOLOGY SPECIAL ISSUE, THE News articles and Reviews discuss such seed plant pathogens as bacteria, fungi, viruses, nematodes, and insects (22 Jun., pp. 2269–2289). Strikingly absent from the discussion topics were parasitic angiosperms, plant pathogens that are plants themselves.

Such parasitic plants are present in most terrestrial ecosystems, but those feeding on food crops are particularly infamous (*1*). Species of the root parasitic genera *Striga* and *Orobanche* are notorious for the devastation they cause in less developed countries. *Striga* is estimated to infest more than two-thirds of the 73 million hectares in cereals and legumes in Sub-Saharan Africa, affecting the daily lives of some 300 million Africans in 25 countries (*2*). *Orobanche* destroys a broad spectrum of host crops, including legumes, vegetables, and sunflowers, in the Mediterranean and Middle East regions. Although developed countries have not escaped the ravages of parasitic plants—dwarf mistletoe (*Arceuthobium* spp.) destroy up to 3.2 billion board feet of lumber per year in western U.S. forests (*3*)—lesser developed countries are most affected.

***Orobanche crenata* damages broad-beans in Syria.**

The International Parasitic Plant Society (http://www.ppws.vt.edu/IPPS/) was inaugurated this year to promote the study of parasitic plants toward the aim of ultimately enhancing world food security. Funding research aimed at controlling parasitic weeds falls outside the agenda of most federal agencies, so it has largely been international agencies and foundations, notably the U.S. Agency for International Development and the Rockefeller Foundation, that pay for these studies. Their efforts have resulted in significant advances toward ameliorating the *Striga* problem, most notably through breeding efforts for developing host resistance.

With the emergence of genomic data from model species such as *Arabidopsis* and rice, novel approaches for controlling these pests can be envisioned. But the first step is bringing the problem to light.

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The Brain's Susceptibility to Amyloid Plaques

AMONG THE MOST CHALLENGING MYSTERIES of Alzheimer's disease is the identification of factors that render the brain particularly susceptible to the extracellular deposition of β-amyloid (Aβ). Aβ peptides are thought to be toxic and are the central component of neuritic plaques, which are preferentially localized to brain regions that are critical for memory, cognition, emotional state, and personality.

Recent research has begun to provide new clues concerning the biological basis for the vulnerability of the brain to these abnormalities, and this information has relevance to developing therapies for Alzheimer's. Aβ is generated from cleavages of the β-amyloid precursor protein (APP) by β site APP-cleaving enzyme 1 (BACE1) (*1*, *2*) and by an enzyme activity termed γ-secretase. In vivo, BACE1 has been found to be the principal β-secretase necessary to cleave APP to generate Aβ (*3*). In contrast, APP can also be cleaved within the Aβ sequence by putative "α-secretases" or by BACE2 to release the ectodomain (the amino-terminal soluble fragment) of APP (*4*); these cleavages within the Aβ domain of APP preclude the formation of Aβ. In Alzheimer's, why is the brain but not any other organ (such as the pancreas, for example) particularly vulnerable to Aβ deposition?

BACE1 and BACE2 are expressed ubiquitously, but levels of BACE1 messenger RNA (mRNA) are particularly high in brain and pancreas, whereas the levels of BACE2 mRNA are relatively low in all tissues, except in the brain, where it is nearly undetectable. Because BACE1 is the principal β-secretase in neurons and BACE2 limits the secretion of Aβ peptides, we propose that BACE1 is a pro-amyloidogenic enzyme, whereas BACE2 is an anti-amyloidogenic enzyme.

In this scenario, the relative levels of BACE1 and BACE2, in concert with the abundance of APP in neurons, are major determinants of Aβ formation. Under this model, the secretion of Aβ peptides would be expected to be highest in neurons and brain, as compared with other cell types or organs, because neurons express high levels of BACE1 coupled with low expression of BACE2. If the ratio of the level of BACE1 to BACE2 is a critical factor that selectively predisposes the brain to the formation of Aβ, Alzheimer's disease would be predicted to involve the brain rather than heart or pancreas.

Seemingly inconsistent with this hypothesis is the observation that there are very high levels of BACE1 mRNA in the pancreas (*1*). It appears that some of this mRNA is alternatively spliced to generate a BACE1 isoform that is incapable of cleaving APP (*5*); thus, Aβ is not deposited in the pancreas. Taken together with the observations that the pancreas has low levels of BACE1 protein (*6*), as well as low BACE1 enzymatic activity (*2*), these results are consistent with the view that a high ratio of BACE1 to BACE2 activity is a major determinant of selective vulnerability of the brain to formation of Aβ plaques.

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