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EPILEPSY

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Epilepsy has been documented for thousands of years and can affect anyone at any age. There are at least a dozen types of epilepsy — the exact number depends on who is being asked — that can start in and spread to different brain regions, creating a range of seizure types. The World Health Organization conservatively estimates that 50 million people worldwide have epilepsy; yet, despite its prevalence, the condition attracts relatively little research funding (page S2).

Part of the reason for the dearth of treatments is the long history of social stigma and fear that once surrounded people with the condition (page S10). Perhaps the most complex piece of the epilepsy puzzle is the fact that we still don't understand the brain itself; simply knowing some of the roles of neurotransmitters and ion channels does not explain why some people develop epilepsy (page S4). Studies have helped us understand enough of epilepsy's neurobiology to use surgery as a treatment, which is why neurologist Samuel Wiebe proposes that this tool is used more widely (page S7).

Neuroscience and genetics have exposed crucial pieces of the epilepsy process, but studies have not determined the network of genes that drive seizures (page S8). Until recently even drug-makers tackled epilepsy by trial and error, but now researchers are using new targets and drug development strategies to help create more effective medicines (page S12). A high-fat, low-carbohydrate diet can help reduce seizure frequency in young children (page S14), and in the future, sensors that can be worn to predict an oncoming seizure could have clinical and research applications (page S16).

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Contributing Editor

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