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Our chromosomes are classically depicted as floppy pieces of spaghetti. However, there exists another flavor of DNA in a circular form. This class, called Extrachromosomal circular DNA (eccDNA), comprises products of genomic shuffling (or recombination) that cause somatic changes in gene length and sequence. These circular molecules are derived (or "shed") from linear chromosomal loci, expanding the diversity in coding and regulatory capacity within eukaryotic genomes. Using a brand-new multidisciplinary approach to investigate eccDNA-mediated allelic diversity, I have identified various coding regions of eccDNA formation, such as Titin and Mucin loci. In order to systematically investigate the biological implications and mechanisms of eccDNA formation, this talk will focus on Titin eccDNAs as a prototype for eccDNA-mediated chromosomal rearrangements. Titin is an extremely large protein that is responsible for the passive elasticity of muscle, functioning as a molecular spring. TTN is expressed in various isoforms, each with its own associated "spring constant" conferring a specific rigidity to cardiac muscle fiber. Preliminary data we obtained suggest a novel mechanism of TTN diversity involving circular-DNA excision that generates recombinant TTN loci at the DNA level. (Received August 27, 2018)