



# SFB 680

## Molecular Basis of Evolutionary Innovations

Molekulare Grundlagen evolutionärer Innovationen

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### **Low-frequency hearing in mammals**

Humans can hear sound at frequencies from about 20 Hz to 20,000 Hz. The lower part of this enormous frequency range, however, suffices for most of speech and music: telecommunication employs a voice frequency range from approximately 300 Hz to 3,400 Hz, and a piano's keys are tuned from 27.5 Hz to 4,186 kHz. Sound detection is achieved in the inner ear, or cochlea, which spatially separates frequencies: high frequencies are detected at the organ's base, and lower frequencies at more apical positions. While a mechanism, termed critical-layer absorption, has been identified for spatial separation of the high frequencies above 4,000 Hz, it does not apply for lower frequencies; understanding of low-frequency selectivity is currently lacking. We discuss a recently proposed ratchet mechanism for spatial separation of low frequencies. The mechanism employs the synergistic interplay of two known active processes in the mechanoreceptive hair cells to implement unilateral amplification; it thereby represents a mechanical analogue of the operational amplifier from electrical engine

**October 14, 2010**

**4:00 p. m.**

**Institute for Genetics, seminar room, 4th floor**

**Host: Stéphane Ghozzi**

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