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Review Summarizes of Bone Biology

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Description

Bone is a dynamic tissue whose remodeling throughout life is orchestrated by repeated cycles of destruction mediated by osteoclasts and rebuilding by osteoblasts. The phenotypic analysis of knockout mice exhibiting abnormal bones has largely contributed to our current understanding of bone biology and its pathology. During the last decade, a number of mass spectrometry-based quantitative methods have been developed to investigate the complexity of biological systems. Such methods can provide an integrated view onto protein networks and posttranslational modifications that might be important for bone cell differentiation and function. This review summarizes how such approaches can contribute to understand bone biology.

Bone Biology

Imagine a world where machines can program cells to deliver therapeutics in a remote-controlled, time-specific, and targeted manner. Or, what if physicians could collect data continuously to establish intimate links between therapy and disease progression? Such machine biology systems could empower physicians beyond imagination and give rise to personalized treatments.

Church's thesis is a metamathematical hypothesis that says the concepts of effective calculability and computability is coextensive. It is reasonable to consider everything that happens in the material world to be ‘effective’. If Church's Thesis were true in the natural world, then it would mean that all material processes could be expressed in purely syntactic terms. A corollary in relational biology is that a living system must have non-computable models. Thus the existence of living systems implies that Church's Thesis is false as a physical proposition. The paper begins with a review of the tenets of relational biology, which is the standpoint from which this exposition on the Foundations of Mathematics and Theoretical Biology is composed.

Print and online media may reflect changing perceptions about wildlife when viewed in a historical context, as conservation programs bring about increased awareness of declining species. With a proven history of public misunderstanding and persecution, we focused on a nongame and at-risk species, the hellbender salamander. To determine whether public perceptions of hellbenders change according to societal interests over time and to test Shaw's conservation eras, we conducted a content analysis of 288 newspaper articles over the past 153 years of coverage through conservation eras, including: Exploitation, protection, game management, environmental management, and conservation biology. In addition, we examined trends in more recent online media coverage. As measured by article frame (valence values), we detected an increase in positive perceptions about hellbenders in newspapers after 1980, which coincides with the conservation biology era. Many articles published within the exploitation era included informative natural history while articles in the conservation biology era included information about the species decline or efforts to conserve and restore populations. Article frames from the conservation biology era were more positive than any other era. Conservation efforts likely impacted online media coverage, which increased following the federal listing of ozark hellbenders and their successful captive rearing by the St. Louis zoo in 2011. Because knowledge is generated and accessed more readily than ever, and we observed media is representative of societal changes, we anticipate a new era of conservation to follow the digital information age.

It is of utmost importance that conservation efforts are supported by both the public and policymakers. A mismatch between governance and public opinion might occur because of flawed information or biases that are held by people or governmental decision-makers. Despite over a century of scientific support for species conservation, there are many misunderstood or even feared organisms that are overlooked by society at large and may receive less attention and potentially less support for conservation than charismatic megafauna. For centuries, society has shunned or even persecuted animals which provoke strong emotional feelings, like wolves, alligators, bats, or snakes because of fear, hate, incorrect assumptions about perceived threats or risk of harm to themselves or their livelihoods. Public perceptions of wildlife attitudes likely represent complex factors informed by stakeholder experience, occupation, level of education, location (rural versus urban), or social identity. Moreover, scientists and conservation managers may not have utilized emerging

forms of dissemination of information, as some of the myths and misconceptions of wildlife may be the result of inaccessible natural history knowledge, where only academic institutions hold primary literature, representing limited communication between scientists and stakeholders creating a knowledge gap and disconnect between researchers and the public. Media often perpetuates commonly held beliefs and can reflect societal views on conservation issues. Consequently, fears may come from media stories that transcend generations through books, movies, television, and even printed news media. The scientific community works to protect some of the most socially unaccepted organisms because research shows that they are more important to us alive and may provide ecological services. For example: as a predator, wolves positively support environments by controlling elk populations to minimize overgrazing; bats control insect pests and pollinate agricultural plants providing a large economic benefit to society; and alligators are ecosystem engineers that create small wetland depressions that support the survival of many species. However, despite decades of scientific data, outreach, and education, many species continue to lack positive support for conservation from society at large.

Some shifts in support of species conservation might follow large social changes. However empirical data is lacking across historical time frames for many species to evaluate societal shifts in conservation while providing a historical and ecological context for contemporary biological conservation. Shaw mapped out the United States history of societal changes regarding conservation, which he termed conservation eras. These eras trace a history of exploitation and protection to game and environmental management, and our current Conservation Biology era. Conservation eras outline how social changes respond to the use and misuse of natural resources, by showing investments in legislation that represent society priorities, like the lacey, migratory bird treaty, tennessee valley authority endangered species, clean air, and many other united states acts. Other conservation eras are marked by social movements, such as earth day.