

BIO-info 21/2011, 10. juni 2011 [BIO: sakslistor og møtereferater](#) [BIO-info arkiv](#)
submission deadline to bio.info@bio.uib.no is Wednesday 16:00

Fra toppen!

God innsats

Det var mange som pustet ut på onsdag da NFR-fristen gikk ut kl. 13.00. Totalt gikk det 28 søknader fra BIO til de ulike programmene som var lyst ut, hovedsakelig til FRIMEDBIO. Dessuten er vi tett inne i 3-4 søknader fra Uni, og sikkert i flere som vi ikke har fått oversikt over. I tillegg er vi involvert i 7 søknader om sentre for fremragende forskning (SFF), hvorav én utgår fra BIO med Dag Aksnes i førersetet (Centre for Ocean Ecosystem Theory). Dette betyr at BIO er med på søknader til NFR om nærmere 900 mill. NOK!

Totalt fikk NFR inn 1675 søknader til denne fristen, hvorav 982 til FRIPRO-utlysningen (435 til FRIMEDBIO). Det som blir spennende nå, er om budsjetttrammene for de frie programmene blir øket i tråd med innstillingen om Fellesløftet (og for så vidt i tråd med anbefalingene fra Fagerberg-utvalget). I så fall kan det bli noen hyggelige e-poster fra NFR i slutten av november.

Også SFF-prosessen blir spennende å følge. Fra UiB ble det totalt sendt 23 SFF-søknader. I tillegg til vår egen, er BIOs forskere involvert i flere sterke søknader. Og i løpet av juli legger EU ut neste runde i FP7-utlysningen. Her blir det flere aktiviteter å søke på for BIO-forskere: Mat, jordbruk, fiskeri og bioteknologi - Miljø og klima - Morgendagens hav - Helse osv. Det er bare å sikte seg inn mot neste søknadsfrist!

God pinse!

Hilsen Anders



Ukens bilde



Håkon Mosby

Fotograf: Louise Lindblom

Forskningsfartøyet "Håkon Mosby" på vei ut på tokt med marin biodiversitets-forskere og -studenter fra BIO og Bergens Museum!

You are invited to submit photos (electronically!) for "Ukens bilde". Please include a very short description and credit information. Picture can be of researchers / students in action, technology, organisms, field sites ... Please send your pictures to bio.info@bio.uib.no

Innhold:

| | |
|---|---|
| God innsats | 1 |
| Ukens bilde | 1 |
| Siste nytt fra BIO | 3 |
| Nature paper from BIO postdoc Antonio García-Moyano; | 3 |
| Siste nytt fra verden rundt oss | 3 |
| Forskningsrådet utvider finansieringsordning for ERC; Forskningsrådets innspill til EUs neste rammeprogram; Ledige stillinger for biologer | 3 |
| Forskning: utlysninger, nye satsinger og prosjekter | 3 |
| UiB gjesteforskermidler og strategiske såkornmidler; Kjell Moens minnefond; NORKLIMA; Første JPI utlysning; NFR Matprogrammet; SIU Eurasia; Stipend til Japan; CLIMIT | 4 |
| PhD: disputas og prøveforelesning | 5 |
| Disputas: Skoglund, Prøveforelesning Sandbakken | 5 |
| Avsluttende mastergradseksamen | 6 |
| Årstøl, Austad, Straume Normann, Ngupula, Silva, Cielkas, Quyen, Karlson, Ferter, Hamadi | 6 |
| Kurs, møter, seminar og arrangement | 7 |
| Info-Seminar Marie Curie; EMBO course ; CERN student visits; EcoHCC'11; Onassis Summer School ; | 7 |
| Nye artikler | 8 |
| Garcia-Moyano; Kennedy J; Skjæråsen; Geffen; Mangel; Haave; Bernhard; Lundebye; | 8 |

Siste nytt fra BIO

Nature paper from BIO postdoc Antonio García-Moyano;

Nature paper: “Nematoda from the terrestrial deep subsurface of South Africa”

Antonio García-Moyano, a post-doc researcher at the Department of Biology and the Centre for Geobiology was coauthor on a paper published in Nature 3 June. You can read more of their exciting discovery of “worms from hell” on [CGB homepage](#) and access the full paper [here](#)



Siste nytt fra verden rundt oss

Forskningsrådet utvider finansieringsordning for ERC; Forskningsrådets innspill til EUs neste rammeprogram; Ledige stillinger for biologer

Forskningsrådet utvider finansieringsordning for ERC



Forskningsrådets strategi om å finansiere unge forskere som når høyt opp i konkurransen om midler fra EUs åpne arena har vært vellykket. Nå innfører Forskningsrådet tilsvarende ordning for de etablerte forskerne. [Les mer](#)

Samordning, forenkling og samfunnsutfordringer

Større samordning på europeisk nivå mellom forskning og innovasjon, mer vekt på store samfunnsutfordringer og enda mer trykk på forenkling av finansieringsordningene. Det er noen av hovedpunktene som Forskningsrådet har spilt inn til EUs høringsrunde om det rammeprogrammet som skal avløse 7RP samt andre programaktiviteter innen forskning og innovasjon. [Les mer](#)

Ledige stillinger for biologer

Stillinger utlyst på BIO finner du nederst til høyre på instituttets [nettside](#).

Professor Lund University

Lund University announces an opening: Professor in Systematic Biology
Application deadline: 15. September 2011. [More info](#)

Two lectureships in ecology and aquatic biology at Glasgow

- 1: Lecturer in Ecology, Evolution or Organismal Biology, [More info](#)
- 2: Lecturer in Marine and Freshwater Biology, [More info](#)

Both positions are available at Institute of Biodiversity, Animal Health and Comparative Medicine (BAHCM)

Forskning: utlysninger, nye satsinger og prosjekter

Husk å sende søknadsutkastet til post@bio.uib.no 1 uke i forveien (gjelder ikke mindre bevilgninger som legater og fonds)

UiB gjesteforskermidler og strategiske såkornmidler; Kjell Moens minnefond; NORKLIMA; Første JPI utlysning; NFR Matprogrammet; SIU Eurasia; Stipend til Japan; CLIMIT

Utlysning av UiB gjesteforskermidler og strategiske såkornmidler 2011

Vedlagt følger utlysning av gjesteforskermidler og strategiske såkornmidler fra Forskningsadministrativ avdeling. Søknader skal gå via institutt og fakultet. BIOs frist for innlevering av søknader er **mandag 20.6 kl 12**. For mer info: [Utlysning for gjesteforskermidlene](#) og [Utlysning for strategiske såkornmidler](#)

KJELL MOENS MINNEFOND - til bevaring av tanalaksen

– FORLENGET SØKNADSRIST T.O.M. 15 JUNI 2011

Utlysning av tilskudd i 2011 for studenter, forskere og foreninger – støtte til forskning og undersøkelser av alle forhold rundt villaksen i Tanavassdraget. [Mer info](#)

Impacts of climate change on the environment and communities in the polar regions (NORKLIMA)

Up to NOK 30 million is available from the Research Council's polar initiative as a follow up to IPY and the Policy for Norwegian Polar Research (2010-2013). Research projects must address the impacts of climate change on the environment and/or communities in the polar regions. Deadline: 31.08.2011 13:00 CET [Read more](#)

Norge deltar i den første utlysningen i et Joint Programming Initiative (JPI).

Utlysningen er publisert i programmet **Joint Programming Neurodegenerative Disease** (JPND) med tittelen "**Neurodegenerative Diseases - a call for European research projects for the optimisation of biomarkers and harmonisation of their use between clinical centres**".

Utlysningen etterspør forskning på biomarkører for følgende neurodegenerative sykdommer:

- Alzheimer's disease and other dementias
- Parkinson's disease and PD related disorders
- Prion disease
- Motor neurone diseases
- Huntington's disease
- Spinocerebellar ataxia
- Spinal muscular atrophy

Prosjektene det søkes støtte til må ha **samarbeidspartnere fra minst fire institusjoner i minst fire land** som deltar i utlysningen. Utenom Norge deltar følgende land: [Belgia](#), [Danmark](#), [Finland](#), [Frankrike](#), [Hellas](#), [Irland](#), Italia (ikke ennå bekreftet), [Luxemburg](#), [Nederland](#), Polen, [Portugal](#), [Slovakia](#), [Slovenia](#), [Spania](#), Storbritannia, [Sverige](#), [Sveits](#), [Tyrkia](#) og [Tyskland](#).

Søknadsfristen er 5. september 2011.

Utlysningen med tilhørende informasjon finnes [her](#)

Kontaktperson for norske søkere er Karianne Solaas, Avdeling for helse, Norges forskningsråd, telefon 22037084, kso@rcn.no

Matprogrammet: Norsk mat fra sjø og land (MATPROGRAMMET)

NFRs Matprogram lyser ut midler til

- etablering/videreføring av nettverk for forskningssamarbeid
- gjesteforskerstipend
- mobilitetsstipend
- midler til konferansestøtte

Frist: 31.08.2011 [Les mer](#)

BIO-info

Nyheter fra Institutt for biologi

SIU- Eurasia

Det er gjennom Eurasia-programmet mulig å søke om disponering av stipendplasser på bachelor, master- og phd-nivå for studenter fra landene i Eurasia-programmet (Armenia, Aserbajdsjan, Georgia, Hviterussland, Kasakhstan, Kirgisistan, Moldova, Tadsjikistan, Turkmenistan og Ukraina).

Det kan søkes om plasser for delstudium (minimum 3 mnd. til 2 semester) i perioden høst 2011 - høst 2014, og stipend for full mastergrad, med oppstart høsten 2012 eller våren 2013. [Mer info](#)

Utllysning av stipender til Japan (NFR)

JSPS - gjesteforskerstipend til Japan (IS-JSPS)

Forskningsrådet innstiller hvert år to norske forskere til gjesteforskerstipend i Japan. Stipendene er åpne for søkere innen humaniora, samfunnsvitenskap, naturvitenskap og teknologi.

Søknadsfrist: 31.10.2011 00:00 CET [Les mer](#)

JSPS - postdoktorstipend til Japan (IS-JSPS)

Forskningsrådet innstiller hvert år to norske postdoktorer til postdoktorstipend i Japan. Stipendene er åpne for søkere innen humaniora, samfunnsvitenskap, naturvitenskap og teknologi.

Søknadsfrist: 15.06.2011 00:00 CET [Les mer](#)

Researcher Projects and Knowledge-building Projects for Industry in the area of CCS (CLIMIT)

Funding is available for Researcher Projects and Knowledge-building Projects for Industry with start-up in 2012. This call encompasses CO2 capture, transport and storage, restricted to clearly defined scientific areas. An estimated NOK 10-15 million is available under this call for 2012.

Deadline: 31.08.2011 13:00 CET [Read more](#)

PhD: disputas og prøveforelesning

Disputas: Skoglund, Prøveforelesning Sandbakken

Helge Skoglund: Når bør lakseungene forlate redet?

Helge Skoglund disputerer for ph.d.-graden onsdag 15. juni med avhandlingen: "Seasonal timing of emergence from nests - Effects of temperature and competition on offspring performance in salmonide fishes"

Veiledere: Sigurd Einum, Bjørn Barlaup, Per Jakobsen

Bedømmelseskomite: Professor Neil Metcalfe, University of Glasgow, Skottland, Storbritannia, Professor Thrond Haugen, Universitetet for miljø- og biovitenskap, Ås, Førsteamanuensis, Jeppe Kolding Institutt for biologi(leder)

Leder av disputasen: Professor Petter Larsson, Universitetet i Bergen

Tid: Onsdag 15. juni 2011, kl. 10.15

Sted: Stort auditorium, Høyteknologisenteret, Thormøhlensgate 55

Alle inneresserte er velkommen

http://www.uib.no/info/dr_grad/2011/Skoglund_Helge.html



Mari Sandbakken: Biorythm of sleep: do fish sleep at night?

Mari Sandbakken holder onsdag 15. juni prøveforelesning for ph.d. graden.

Bedømmelseskomite: Ivar Rønnestad, Geir K. Totland, Arne Johannessen

Tid og sted: Onsdag 15. mai, kl. 14:15, Lite Auditorium, Høyteknologisenteret

Alle interesserte er velkommen.

Avsluttende mastergradseksamen

Årstøl, Austad, Straume Normann, Ngupula, Silva, Cielkas, Quyen, Karlson, Ferter, Hamadi

Trine Årstøl: Moldtaking; ein tradisjonell bruksmetode med eit nytt liv?

Trine Årstøl holdt avsluttende presentasjon av sin masteroppgave i Integriert lektorutdanning med master i naturvitenskap.

Veiledere Jon-Arvid Grytnes, Tom Klepaker, Bisitter: Nils Kåre Birkeland. Sensor Mons Kvamme
Tid og Sted: Torsdag 9. juni, kl. 10.00, seminarrom K1, Biobyggene

Sturla Austad: The morphology of the threespine stickleback and its relation to predators and parasites, from three lakes in western Norway

Sturla Austad holder fredag 10. juni avsluttende presentasjon av sin masteroppgave i Integriert lektorutdanning med master i naturvitenskap.

Veiledere: Per J. Jakobsen, Tom Klepaker Sensor: Geir H. Johnsen, Rådgivende biologer

Tid og Sted: Fredag 10. juni, kl. 10:15, Seminarrom K1, 1. etasje, Biobyggene

Eirik Straume Norman: Spatial distribution of seatrout spawning and the effects on juvenile abundance in river Teigdalselva, western Norway

Eirik Straume Normann holder fredag 10. juni avsluttende presentasjon av sin masteroppgave i Biologi, Biodiversitet, evolusjon og økologi.

Veiledere: Per J. Jakobsen, Bjørn Barlaup. Sensor: Geir H. Johnsen, Rådgivende Biologer

Tid og Sted: Fredag 10. juni kl. 13:15, Seminarrom K1, 1. etasje, Biobyggene

Godfrey Ngupula: Characterization of the Atlantic cod (*Gadus morhua* L) eggs for estimation of spawning time and proportion of spawning females

Godfrey Ngupula holder avsluttende presentasjon av sin masteroppgave i Havbruksbiologi.

Veiledere: Audrey Geffen, Andreas Steigen. Bisitter: Arne Skorping. Sensor Åsmund Bjordal, HI

Tid og sted: Fredag 10. juni, kl 11.00, Seminarrom K3, 1. etasje, Biobyggene

Filipa Silva: Strategies for partition between reproductive investment and body growth in stationary and migratory stocks of Atlantic herring

Filipa Silva holder **tirsdag 14. juni** avsluttende presentasjon av sin masteroppgave i fiskeribiologi og forvaltning.

Tittel på oppgaven: Strategies for partition between reproductive investment and body growth in stationary and migratory stocks of Atlantic herring

Veiledere: Arne Johannesen og Olav S. Kjesbu (HI). Sensor: Ørjan Karlsen. Bisitter: Rune Rosland.

Tid og sted: Tirsdag 14. juni kl. 10:15, Seminarrom K3, 1 etasje, Biobyggene

Endre Cielkas: Methods for acoustic identification and measurements of copepod abundance at specific North Sea sandeel grounds

Endre Cielkas holder **tirsdag 14. juni** avsluttende presentasjon av sin masteroppgave i marinbiologi - akvatisk økologi.

Tittel på oppgaven: Methods for acoustic identification and measurements of copepod abundance at specific North Sea sandeel grounds

Veiledere: Egil Ona og Espen Johnsen. Sensor: Svein Iversen. Bisitter: Magnar Aksland.

Tid og sted: Tirsdag 14. juni kl. 11:15, Seminarrom K1, 1 etasje, Biobyggene

BIO-info

Nyheter fra Institutt for biologi

Vu Dang Ha Quyen: Analyses of the fish pathogenetic *Streptococcus iniae*

Vu Dang Ha Quyen holder **onsdag 15. juni** avsluttende presentasjon av sin masteroppgave i biologi - mikrobiologi.

Tittel på oppgaven: Analyses of the fish pathogenetic *Streptococcus iniae*

Veileder: Heidrun Wergeland. Sensor: Brith Hjeltnes (Veterinærinstituttet). Bisitter: Ian Mayer.

Tid og sted: Onsdag 15. juni kl. 14:00, Seminarrom K1, 1 etasje, Biobyggene

Stine Karlson: Age determination of Atlantic halibut (*Hippoglossus hippoglossus* L.) - Size at age and regional growth differences along the coast of Norway

Stine Karlson holder onsdag 15. juni avsluttende presentasjon av sin masteroppgave i fiskeribiologi og forvaltning.

Tittel på oppgaven: Age determination of Atlantic halibut (*Hippoglossus hippoglossus* L.) - Size at age and regional growth differences along the coast of Norway

Veiledere: Arild Folkvord og Kathrine Michaelsen (HI). Sensor: Torstein Pedersen (UiT). Bisitter: Øyvind Fiksen.

Tid og sted: Onsdag 15. juni, kl. TBA, Seminarrom K3, 1 etasje, Biobyggene

Keno Ferter: Marine Angling Tourism in Norway: The Interaction between Behaviour, Management and Catch

Keno Ferter holder fredag 17. juni avsluttende presentasjon av sin masteroppgave i fiskeribiologi og forvaltning

Tittel på oppgaven: Marine Angling Tourism in Norway: The Interaction between Behaviour, Management and Catch

Veileder: Jeppe Kolding. Sensor: Petter Holm (UiT). Bisitter: TBA.

Tid og sted: Fredag 17. juni, kl. TBA, Seminarrom K1, 1 etasje, Biobyggene

Miriam Nerdal Hamadi: *Desmoozon lepeophtherii* as a pathogen in Norwegian salmon aquaculture

Miriam Nerdal Hamadi holder fredag 17. juni avsluttende presentasjon av sin masteroppgave i fiskehelse.

Tittel på oppgaven: *Desmoozon lepeophtherii* as a pathogen in Norwegian salmon aquaculture

Veiledere: Frank Nilsen og Øyvind Vågenes. Sensor: Bjørn Krossøy. Bisitter: Sigurd Stefansson.

Tid og sted: Fredag 17. juni, kl. 10:15, Seminarrom K3, 1 etasje, Biobyggene

Liste over kommende mastereksamener [her](#).

Kurs, møter, seminar og arrangement

Info-Seminar Marie Curie; EMBO course ; CERN student visits; EcoHCC'11; Onassis Summer School ;

Reminder: Info-Seminar on EUs Marie Curie Individual fellowships and networking actions June 16th

UiB has invited Judith Litjens, adviser at the UK Research Office (UKRO), UKs national contact point for Marie Curie actions to a seminar in Bergen which will take place June 16th at Vilvite seminar rooms C and D. Time: 10:00-13:00

June 16th: information day on Marie Curie proposals (individual post doc stipends and networking actions for PhD education and researcher exchange) [Register here](#)

EMBO course

EMBO Course on Protein Bioinformatics Tools Focus on Regulatory Proteins: Sequences, Structures, Interactions, Networks, on September 25-30. this autumn. Application deadline is June 19th. [More info](#)

International Conference on Ecohydrology and Climate Change

The 2nd edition of the International Conference on Ecohydrology and Climate Change – EcoHCC'11 will be held in Tomar (Portugal) from 15 to 17 September 2011. [More info](#)

International students visit to CERN, PSI, ESRF, ILL

The International Nuclear Chemistry Society (INCS) have recently started the organization of some "Scientific and Technological Youth Tours" worldwide for graduate or undergraduate students. [More info](#)

Onassis Summer School in Biology

is devoted to: "Basic and Applied Virology". Excellent students and young scientists encouraged from to apply. [More info](#)

Viteniverksetterkonferanse

Den 3. nordiske viteniverksetterkonferansen finner sted i Helsingfors 27. september. [Mer info](#)

Nye artikler

Garcia-Moyano; Kennedy J; Skjæråsen; Geffen; Mangel; Haave; Bernhard; Lundebye;

Borgonie G, **Garcia-Moyano A**, Litthauer D, Bert W, Bester A, van Heerden E, Moller C, Erasmus M, Onstott TC (2011) Nematoda from the terrestrial deep subsurface of South Africa. *Nature* 474:79-82

Abstract: Since its discovery over two decades ago, the deep subsurface biosphere has been considered to be the realm of single-cell organisms, extending over three kilometres into the Earth's crust and comprising a significant fraction of the global biosphere. The constraints of temperature, energy, dioxygen and space seemed to preclude the possibility of more-complex, multicellular organisms from surviving at these depths. Here we report species of the phylum Nematoda that have been detected in or recovered from 0.9–3.6-kilometre-deep fracture water in the deep mines of South Africa but have not been detected in the mining water. These subsurface nematodes, including a new species, *Halicephalobus mephisto*, tolerate high temperature, reproduce asexually and preferentially feed upon subsurface bacteria. Carbon-14 data indicate that the fracture water in which the nematodes reside is 3,000–12,000-year-old palaeometeoritic water. Our data suggest that nematodes should be found in other deep hypoxic settings where temperature permits, and that they may control the microbial population density by grazing on fracture surface biofilm patches. Our results expand the known metazoan biosphere and demonstrate that deep ecosystems are more complex than previously accepted. The discovery of multicellular life in the deep subsurface of the Earth also has important implications for the search for subsurface life on other planets in our Solar System.

Kennedy J, Nash RDM, Slotte A, Kjesbu OS (2011) The role of fecundity regulation and abortive maturation in the reproductive strategy of Norwegian spring-spawning herring (*Clupea harengus*). *Marine Biology* 158:1287-1299

Abstract: This study investigates the reproductive strategy, an important component in the estimation of stock reproductive potential, in Norwegian spring-spawning (NSS) herring (*Clupea harengus*), an iteroparous, extreme capital spawner, through the estimation of fecundity over a period of 3 years including two complete maturation cycles and three spawning seasons. NSS herring have an 'optimistic' strategy, with almost all adult herring caught in August being in the vitellogenic stage of ovary development, despite overwintering energy levels not being determined at this time. Fecundity in the summer, i.e., more than half a year before spawning in spring (February-April), was also much higher than could be supported by an individual's concurrent energy levels. Consequently, fecundity was later reduced through atresia with the majority of this occurring before overwintering. The total reduction and the length of the time period in which the reduction took place appeared to vary between years. During the spawning season, atresia was mostly prevalent in small first-time spawners < 180 g and several individuals aborted ovary development at this time. Final fecundity varied between years with a difference of up to 18% and was linked to annual variations in condition. In conclusion, this extensive field study has demonstrated that each individual herring can display a suite of size-

specific reproductive tactics to fine-tune oocyte production in response to fluctuating levels of planktonic prey.

Kennedy J, Skjaeraasen JE, Nash RDM, Slotte A, Geffen AJ, Kjesbu OS (2011) Evaluation of the frequency of skipped spawning in Norwegian spring-spawning herring. *Journal of Sea Research* 65:327-332

Abstract: Based upon an under-representation of second time spawners on the spawning grounds between 1935 and 1973, researchers have suggested that Norwegian spring-spawning (NSS) herring (*Clupea harengus*) frequently skip their second spawning event. In order to evaluate this claim with direct evidence, herring were collected over a period of three years from statutory surveys and commercial catches over a wide area covering the feeding, over-wintering and spawning grounds. The development stage of the ovaries was assessed and the intensity of atresia quantified. Only a negligible number of the analysed herring caught were considered likely to skip spawning, thus this phenomenon does not appear to be a common feature of the NSS herring stock at present. In addition, considering the reproductive strategy of herring, it seems doubtful that skipping the second spawning event has ever frequently occurred in this stock.

Dowling NA, Wilcox C, **Mangel M**, Pascoe S. (2011). Assessing opportunity and relocation costs of marine protected areas using a behavioural model of longline fleet dynamics. *Fish and Fisheries* Published online: 5 JUN 2011 DOI: 10.1111/j.1467-2979.2011.00422.x

Abstract: Increasing use of spatial management tools in fisheries requires an understanding of fleet response, and in particular to where displaced fishing effort is likely to move. We develop a state-dependent decision-making model to address the spatial allocation of effort in an Australian tuna longline fishery. We assume that fishers have an economic objective in deciding where to fish, but that decisions in any period are also influenced by the remaining quota held at the time of the decision. Key features of the model include endogenous price dynamics, a moving stock and a competitive pool of different vessel types operating from different port locations. We utilize this model to illustrate fleet responses to marine reserves and limits on fishing effort. The results illustrate that the model framework provides advantages over statistically based models in that decisions made in response to the imposition of a reserve are not consistent with a proportional reallocation of effort. Rather, the stochastic dynamic model yielded an overall profit level of ~4% higher relative to scenarios with no reserve. Incorporating the opportunity cost of a quota into the model resulted in an optimal utilization of effort, in which effort was concentrated in time periods and locations yielding maximized profit. Under a low level of effort relative to the season length, the model indicated an overall profit level 43% greater than the highest obtained when the same level of effort was applied solely within any given quarter of the season.

Haave, M., Bernhard, A., Folven, K.I., Brattelid, T., Lundebye, A.K. Fish consumption reduces transfer of BDE47 from dam to murine offspring. *Chemosphere* 2011;84:348-35 (in press): doi:10.1016/j.chemosphere

Abstract: Fish and seafood are important contributions to a healthy diet, but also contain persistent organic pollutants (POPs) like polybrominated diphenylethers (PBDEs) and polychlorinated biphenyls (PCBs). Discrepancies have been found between intake and accumulated levels of POPs, where fish consumers have had similar levels of POPs to the general population. Similarly fish oil consumption has been found to reduce accumulation of POPs. This study examined the accumulation of BDE47 or PCB153 in mice fed diets with different nutritional composition, using female mice with pre-weanling pups exposed through gestation and lactation. A fish-based diet was compared to a standard casein-based rodent diet. All diets had low background levels of environmental contaminants and were spiked with BDE47 or PCB153 to levels representing a realistic ($\sim 0.004 \mu\text{mol kgbw}^{-1} \text{d}$) or a high dietary exposure ($\sim 1.3 \mu\text{mol kgbw}^{-1} \text{d}$). Accumulation of BDE47 or PCB153 in offspring tissues after 18 d lactation reflected the maternal exposure levels. However, the pups of dams fed a fish-based diet had consistently lower BDE47 accumulation in liver, fat and stomach than pups from casein-fed dams. Similarly the pups of dams fed a high dose of PCB153 in a fish diet also accumulated less PCB153

than pups of the dams fed a casein diet, although not significant. In conclusion, the fish based diets seemed to reduce transfer of BDE47 and PCB153 from dams to pups. The study highlights that in-depth knowledge about nutritional impact on toxicokinetics is of great interest to vulnerable consumers.

Nye bokkapitler:

Conceição, L., C. Aragão and **I. Rønnestad**. Proteins. In Holt. J. (Ed). Larval Fish Nutrition. John Wiley & Sons. (ISBN978-0-8138-1792-7). Pp. 83-116.

Fish larvae have tremendous growth potential, with relative growth rates much higher than juvenile and adult fish. However, to fully express such growth potential protein of the right quality must be provided in sufficient quantity. In fact, fish growth is primarily deposition of muscle protein. In addition, it is well established that amino acids (AA) are a major energy source during the larval stage of most marine teleost species. Still, the AA requirements of fish larvae are poorly understood, and the available knowledge is more of a qualitative nature than precise requirements. In addition, the fast growth of fish larvae is paradoxical when one considers its poorly developed gut. Dietary AA are mostly absorbed as free AA (FAA) or as small peptides. However, these are quickly polymerised into proteins, or used otherwise by larval metabolism. In fact, tissue concentrations of FAA are kept within narrow limits. The yolk-sac contains the large FAA pool present in marine pelagic fish eggs, which may account for up to 60% of the total larval AA. This FAA pool acts both as an osmolyte and as an important energy fuel, in addition to the supply of AA for protein synthesis, before larvae initiate first feeding. Absorbed dietary AA which are not polymerised into proteins can be catabolised for energy production, may be transaminated into other AA, used in gluconeogenesis or lipogenesis, or used in the synthesis of other nitrogen-containing molecules such as purines, pyrimidines or hormones. Furthermore, protein is in continuous turnover, in a very dynamic transfer of AA between the FAA and the protein pools.

In order to meet the high protein requirements of fish larvae the nutrient flux involved is notorious. These large fluxes of AA demonstrate the importance of understanding AA metabolism in order to meet requirements of fish larvae, so their high growth potential can be fully used. The present chapter review the current knowledge on the protein and AA requirements of fish larvae, taking into account the available understanding on protein digestion and AA absorption, as well as on metabolism of larval AA and protein pools.

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Digestion in vertebrates is controlled through a complex series of intrinsic and extrinsic regulatory systems. These systems function to synchronize the flow of food through the digestive system, the release of digestive juices and enzymes, the absorption of nutrients, and the evacuation of the gut. Like most other fundamental processes in animals, there are a host of interwoven systems of signals, responses, and modulators that are all active in ensuring the proper digestion and absorption of food in fish. Currently much of our understanding is still based on work done in mammals and, in some cases, on work done in juvenile and adult fish. In this chapter we will discuss some of the major regulatory systems and signals in the digestive process of vertebrates and highlight what is currently known in larval fish.